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WATER QUALITY IN THE WAPITI-SMOKY RIVER SYSTEM UNDER LOW-FLOW CONDITIONS 1987-1991

A SYNOPSIS OF GOVERNMENT SURVEYS AND MONITORING

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WQ-WAPSM.LRN

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INTRODUCTION

The purpose of this document is to provide a brief update on recent water quality conditions in the Wapiti-Smoky River system. The last report on this river system was released in 1989 and was based on surveys conducted in 1983 (Noton et al 1989).

RECENT GOVERNMENT WATER QUALITY SURVEYS AND MONITORING

A number of water quality and related investigations have been carried out by Alberta Environment and other government agencies since 1983 on the Wapiti-Smoky river system:

1987	October	-	Sediment and zoobenthos for dioxin/furan content
	Oct.-Nov.	-	Fish for dioxin/furan content (Alta. Fish & Wildlife Div.)
1988	November	-	Sediment for dioxin/furan content (joint with Env. Canada - national survey)
1989	March	-	Winter time-of-travel water quality (contracted
	October	-	Water quality survey
		-	Benthic survey
		-	Bottom sediment collection (archived)
1990	Feb.-March	-	Winter time-of-travel water quality
	Jan.-March	-	Continuous oxygen recorders, 4 sites
	Jan.-March	-	Streambed oxygen demand (SOD) survey
	Feb.-March	-	Hydraulic investigation (time-of-travel measurement, Alta. Research Council)
	Fall	-	Initiation of "Medium Term" River Monitoring sites (6x/yr.), Wapiti at Hwy 40 and Wapiti at mouth (Smoky R. at Watino continues monthly throughout)
	Fall	-	Fish collection for contaminants analysis (Alta. Fish & Wildlife Div.)
1991	Jan.-March	-	Continuous oxygen recorders, 4 sites
	Feb.-March	-	Winter time-of-travel water quality
	Feb.	-	Benthic survey

A map of the main water quality sampling sites (Figure 1) is attached. The water quality surveys included sampling of effluents and important tributaries, as well as the mainstem rivers. Except for the Oct. 89 survey, sampling progressed downstream at approximately river time-of-travel. The surveys have been purposely concentrated during the lower-flow seasons (fall and winter) so as to describe conditions when the dilution of effluent is usually lowest. Low flows persist for some 4-5 months of the

year (approximately November-March). Note that the Grande Prairie STP generally discharges for two weeks, then shuts off for two weeks: the discharges and the water quality surveys were timed to coincide during the 1987-91 work.

The data from these surveys were inspected to assess effects on water quality, in the Wapiti River in the Grande Prairie area, and in the Smoky River upstream and downstream of the Wapiti River inflow. Water quality was compared with the Alberta Surface Water Quality Objectives (ASWQO) and the Canadian Water Quality Guidelines (CWQG).

FINDINGS

A synopsis of water quality conditions in the Wapiti and Smoky rivers is compiled in Table 1. Detailed data are appended. Changes in water quality in the studied reaches are described, and comparison is made with the ASWQO and CWQG. A "no" for compliance in Table 1 means that measured water quality was not within the ASWQO and/or the CWQG on at least one of the sampling occasions. The 'condition' column provides the probable reason. Note of course that compliance, when referring to surface water quality objectives or guidelines, does not imply a legal requirement.

In brief, the monitoring has investigated a comprehensive list of variables and found non-compliance in the Wapiti-Smoky River system for odour, colour, sulphide, aluminum, chromium, manganese, total nitrogen, total phosphorus, total phenolics, dichlorophenol, and total coliforms. There is also non-compliance for dioxins/furans in fish. Benthic biota (algae, invertebrates) show evidence of enrichment (eutrophication), but no distinct evidence of toxicity. Effluents from the Procter and Gamble pulp mill appear to be the main cause of these impacts although treated sewage and urban runoff from Grande Prairie, as well as tributary inflows, also contribute for some variables. A number of other variables are also affected (e.g., oxygen, sodium, chloride, zinc, ammonia, organic carbon, resin acids, chloroform, chlorophenolics, AOX) but were not out of compliance with water quality guidelines or objectives.

Comment on some individual variables follows.

Odour

Odour was evaluated in the field on a qualitative four point scale and was also measured in the lab (threshold odour test). The lab measurements were not very reliable since often no odour was reported when it was clearly noticeable in river water in the field. Primary reliance was placed on the field evaluations.

TABLE 1. WATER QUALITY CONDITIONS IN THE WAPITI-SMOKY RIVER SYSTEM
FINDINGS OF SURVEYS AND MONITORING, 1987-91.

VARIABLE	ASWQO mg/L (Unless Noted)	CWQG mg/L (Unless Noted)	WAPITI RIVER CONDITION	WAPITI RIVER COMPLIANCE	SMOKY RIVER CONDITION	SMOKY RIVER COMPLIANCE
Temperature	+3°C	NS	Small increase (≤1°C) due to pulp mill cooling water and main effluent, results in an ice-free reach in winter of ≥5 Km.	yes	No effect.	yes
Odour	≤8 TON	nil	Large increase due to pulp mill effluent, fall and winter.	no	'Pulp-mill' odour persists to mouth, fall and winter.	no
Colour, True	+30 RCU	nil	Large increase due to pulp mill effluent, fall and winter.	no	Large increase in winter due to inflow of Wapiti River	no
Turbidity	+25 JTU	+5 NTU	Small increase on some occasions, due to tributaries and effluents.	yes	No effect.	yes
Suspended Solids	+10	+10	Small increase on some occasions, due to tributaries and effluents.	yes	No effect.	yes
Oxygen	5	6.5/9.5	Declines in winter, to 8.7-11.4 mg/L. No effect in fall.	yes (excl. 9.5)	Declines in winter, to 7.2-10.5 mg/L near mouth.	yes
Na, Cl, SO_4	NS	200-500 (AO)	Large increase due to pulp mill effluent.	yes	Increase in Na and Cl due to inflow of Wapiti, in winter.	yes
TDS (Filt. Residue)	NS	500 (AO)	Large increase due to pulp mill effluent, especially in low-flow winters.	no	Some increase due to Wapiti inflow.	yes
Other Major Ions, F, CN, Silica	NS	NS	Some increases in Ca, K, HCO_3, silica, but no known adverse consequences.	-	No effect.	-
Sulphide	0.05	NS	Large increase due to pulp mill effluent.	no	Moderate increase due to Wapiti inflow.	yes
Al (total)	NS	0.1	Moderate increase due primarily to tributaries and pulp mill storm sewer/cooling water.	no	Small increase due to Wapiti inflow. Non-compliance mostly natural.	no
Cr (total)	0.05	0.002/ 0.02	Large increase on some occasions, due to pulp mill main effluent, tributaries, and sometimes storm sewer/cooling water.	no	Small increase due to Wapiti inflow. Non-compliance mostly natural.	no
Mn (total)	0.05	NS	Large increase, primarily due to pulp mill effluent, secondarily to tributaries.	no	Moderate increase due to Wapiti inflow.	yes
Zn (total)	0.05	(0.03)	Moderate increase (doubles) in winter due to pulp mill effluent, secondly due to tributaries.	yes	No or small increase due to Wapiti inflow.	yes

Other Metals (As, Ag, Ba, Be, B, Cd, Co, Cu, Fe, Hg, Li, Mo, Ni, Pb, Sb, Se, Sr, V). Some non-compliance in both rivers for some of these, but mostly due to natural conditions.

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...Continued

VARIABLE	ASWQO mg/L (Unless Noted)	CWQG mg/L (Unless Noted)	WAPITI RIVER CONDITION	WAPITI RIVER COMPLIANCE	SMOKY RIVER CONDITION	SMOKY RIVER COMPLIANCE
Ammonia-N	NS	ca. 0.45	Large increase due to Grande Prairie sewage; small increase due to pulp mill effluent.	yes	Large increase due to Wapiti inflow.	yes
Total N	1.0	NS	Large increase due to combined influence of Grande Prairie sewage and pulp mill effluent.	no	Moderate increase due to Wapiti inflow.	yes
Total P	0.05	NS	Large increase due to combined influence of Grande Prairie sewage, pulp mill effluent, and tributaries.	no	Large increase in winter, primarily due to Wapiti inflow.	no
Phenolics	0.005	0.001	Large increase due to pulp mill main effluent.	no	Large increase due to Wapiti inflow.	no
Carbon (Diss. Organic)	NS	NS	Large increase due to pulp mill main effluent and secondarily due to tributaries.	-	Large increase due to Wapiti and other tributary inflows.	-
Resin Acids (1 survey-winter)	0.1	NS	Large increase due to pulp mill main effluent and secondarily due to mill storm sewer/cooling water.	yes	Increase due to Wapiti inflow.	yes
Chlorophenolics (µg/L)						
Mono-CP	NS	7	Large increase due to pulp mill main effluent, principally in 2,4-DCP and 2,4,6-TCP.	yes	Large increase due to Wapiti inflow; chlorophenolics persist to Peace River.	yes
Di-CP	NS	0.2		no		yes
Tri-CP	NS	18		yes		yes
Tetra-CP	NS	1		yes		yes
Penta-CP	NS	0.5		yes		yes
Other	NS	NS	Large increase due to pulp mill effluent, principally in 4,5-DC-Guaiacol, TCG's, DC-Catechols, 3,4,5-TCC, and 4,5-DC-Veratrole.	yes	Increase due to Wapiti inflow; most compounds persist to Peace River.	yes
Chloroform (µg/L)	NS	(2)	Up to 1-2 µg/L due to pulp mill main effluent.	yes	Sometimes detectable (<1 µg/L) due to Wapiti inflow.	-
2,3,7,8 TCD Dioxin/Furan	H&W Can: 20 ppt in fish		1987: Present in zoobenthos and sediment downstream of pulp mill.	-	Not investigated.	-
			1987-90: Present in fish in river system, in higher concentrations than in controls.	no	Few data.	-
Other 'Trace Organic Priority Pollutants'			Not detected.		Not detected.	
Tentatively Identified Trace Organic Compounds	NS	NS	Several present due to pulp mill main effluent, especially sulphides, sulphones, thiophenes, and terpenes.	-	Some present due to Wapiti inflow; some persist to Peace River.	-

...Continued

VARIABLE	ASWQO (mg/L Unless Noted)	CWQG (mg/L Unless Noted)	WAPITI RIVER CONDITION	WAPITI RIVER COMPLIANCE	SMOKY RIVER CONDITION	SMOKY RIVER COMPLIANCE
AOX	NS	NS	Large increase due to pulp mill main effluent; AOX is conservative downstream.	-	Large increase due to Wapiti inflow; persists to Peace River.	-
Chlorate (1 survey-winter)	NS	NS	Not detected (<0.5 µg/L).	-	Not investigated.	-
Bacteria (#/100 mL)						
Fecal Coliforms	200	200	Large increase due to varying effect of Grande Prairie STP, pulp mill storm sewer, pulp mill main effluent.	yes	Increase on some occasions due to various tributaries.	yes
Total Coliforms	1000	1000	As for fecal coliforms.	no	Moderate increase due to Wapiti and other tributaries.	yes
Benthos						
Epilithic Chlorophyll	NS	NS	Generally increased in shallow waters - see text.		Not investigated.	
Zoobenthos	NS	NS	Generally increased in numbers in shallow waters - see text.		Not investigated.	

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ASWQO - Alberta Surface Water Quality Objectives
CWQG - Canadian Water Quality Guidelines
NS - not specified or not applicable
nil - the CWQG is no objectionable odour or colour
AO - Aesthetic Objectives, for drinking water. Objectives for other uses are either not specified or are less stringent.
() - indicates tentative or interim guideline
Cr - CWQG: fish 0.02 mg/L; other aquatic life 0.002 mg/L
NH_3-N: the CWQG varies with temp. and pH. The 0.45 is for winter conditions (temp. = 0°C, ph $\leq$ 8.5).
H&WC - Health and Welfare Canada

Oxygen

Oxygen was measured during the water quality surveys, at MTRN/LTRN sites, and by continuous recorders (Figures in Appendix 4). In general there appeared to be about a 2-3 mg/L decline in the Wapiti River from Hwy #40 to the mouth, and a similar decline in the Smoky River from upstream of the Wapiti to Watino. Important factors in the winter oxygen balance and the actual concentrations that occur at any given time are river discharge, effluent BOD loads, extent of ice cover, tributary inflows, and streambed oxygen demand (Macdonald and Taylor, 1990). The lowest oxygen was observed during the survey with the lowest flows, in March 1989. Streambed oxygen demand appeared to be greater downstream of the pulp mill effluent than upstream (Casey 1990).

Na, Cl, SO_4, TDS

These variables were compared to the Canadian Drinking Water Guidelines (Aesthetic Objective) since they are dissolved and not readily removed in water treatment. TDS was non-compliant during the lowest flow winter (March 1989).

Chromium

Chromium was relatively high in the pulp mill main effluent on some occasions and river concentrations increased as a result. Tributaries and the mill's storm sewer/cooling water also contributed significant amounts on some occasions.

Ammonia-N

Grande Prairie treated sewage caused most of the increase in the Wapiti River. Ammonia also appeared to increase through the reach downstream of the pulp mill, suggesting the occurrence of ammonification as a result of decomposition of organic material.

AOX (Adsorbable Organic Halide)

AOX in the Wapiti-Smoky River system was first sampled in October 1989. That work plus Feb.-March 1990 surveys revealed AOX to persist long distances downstream (Noton 1990) and subsequent findings are consistent with this.

Benthos

The two recent benthic surveys, of October 1989 and February 1991, both indicated that the main effect on benthic biota in the Wapiti River was one of enrichment. This results from the organic and inorganic nutrient load in the pulp mill main effluent and, probably to a lesser extent, in the Grande Prairie sewage effluent. Both benthic

chlorophyll a (a measure of algal biomass) and benthic invertebrates tended to be more abundant downstream of the effluents, at least in shallow waters where, because of logistical constraints, sampling is carried out. This trend may have been counteracted to an unknown extent in deeper parts of the river, due to reduced light penetration resulting from the greater colour downstream of the pulp mill.

The winter survey in February of 1991 was conducted during the lowest flow period of the year. The zoobenthic data has yet to be analyzed in detail, but do not indicate marked toxic effects based on the taxonomic composition and abundance of invertebrates. Total numbers generally were higher downstream of the effluents whereas the number of taxa was similar upstream and downstream (Appendix 5). There appeared to be some decline in mayflies (Ephemeroptera) and stoneflies (Plecoptera) downstream of the effluents but it is not known whether this was due to toxicity or eutrophication (enrichment). These groups are known to decline in enriched situations whereas Chironomidae and Oligochaeta generally increase, as was the case here.

Comparison to Previous Surveys

The work in 1983 included a spring, summer, fall, and winter survey, and concentrated primarily on the Smoky River (Noton et al 1989). The 1987-91 work involved more sites on the Wapiti River, more surveys during low flows, and more variables, particularly organic contaminants. Trace organic analyses have improved considerably since 1983, especially for chlorinated phenolics and resin acids. Consequently the 1987-91 work indicates somewhat more impact, although by and large the findings between the two groups of surveys are similar (Table 2).

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TABLE 2. SUMMARY OF FINDINGS AND COMPARISON WITH 1983 SURVEY

Variables Affected By Effluents		Variables Non-compliant Mostly Due to Effluents	
1987-91	1983	1987-91	1983
Temperature			
Odour	Odour	Odour	Odour
Colour	Colour	Colour	Colour
Turbidity			
Suspended solids	Suspended solids		
Oxygen			
Na, Cl, SO_4, TDS	Na, Cl, SO_4, TDS	TDS	
Sulphide	na	Sulphide	na
Al, Cr, Mn, Zn	Mn, Zn	Cr, Mn	Mn
NH_3-N, Total N, P	NH_3-N, Total N, P	Total N, Total P	Total P
Phenolics	Phenolics	Phenolics	Phenolics
Organic C	Organic C		
Tannin and lignin	Tannin and lignin		
Resin acids	na		
Chlorophenolics		Dichlorophenol	
Chloroform	Chloroform		
Dioxins/furans	na	Dioxin/furan in fish	na
"Tent. identified" trace organic compounds	"Other" trace organic compounds		
AOX	na		
Bacteria	Bacteria	Total coliforms	Total coliforms
Benthos (enrichment)	Benthos (enrichment		

na = not analyzed

REFERENCES

Casey, R.J. 1990. Sediment oxygen demand during the winter in the Athabasca River and the Wapiti-Smoky River system, 1990. Prep. for Alta. Environ., Stds. & Approvals Div., and Env. Assess Div. 49 pp.

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Noton, L.R., A.M. Anderson, T.B. Reynoldson, and J. Kostler. 1989. Water quality in the Wapiti-Smoky River system downstream of the Procter and Gamble pulp mill, 1983. Alta. Environ., Environ. Quality Mon. Br., 113 pp.

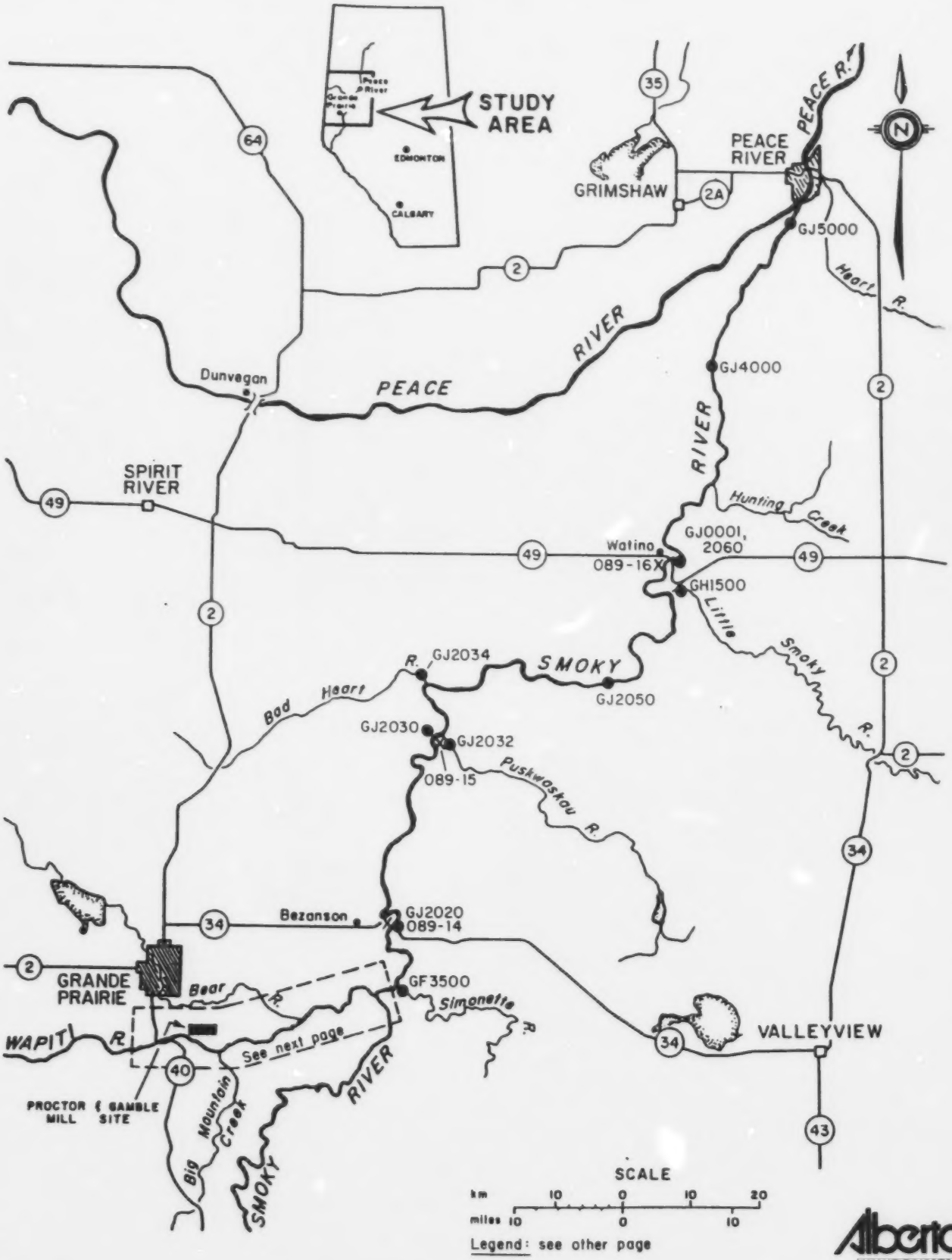

Figure 1. Sampling Sites

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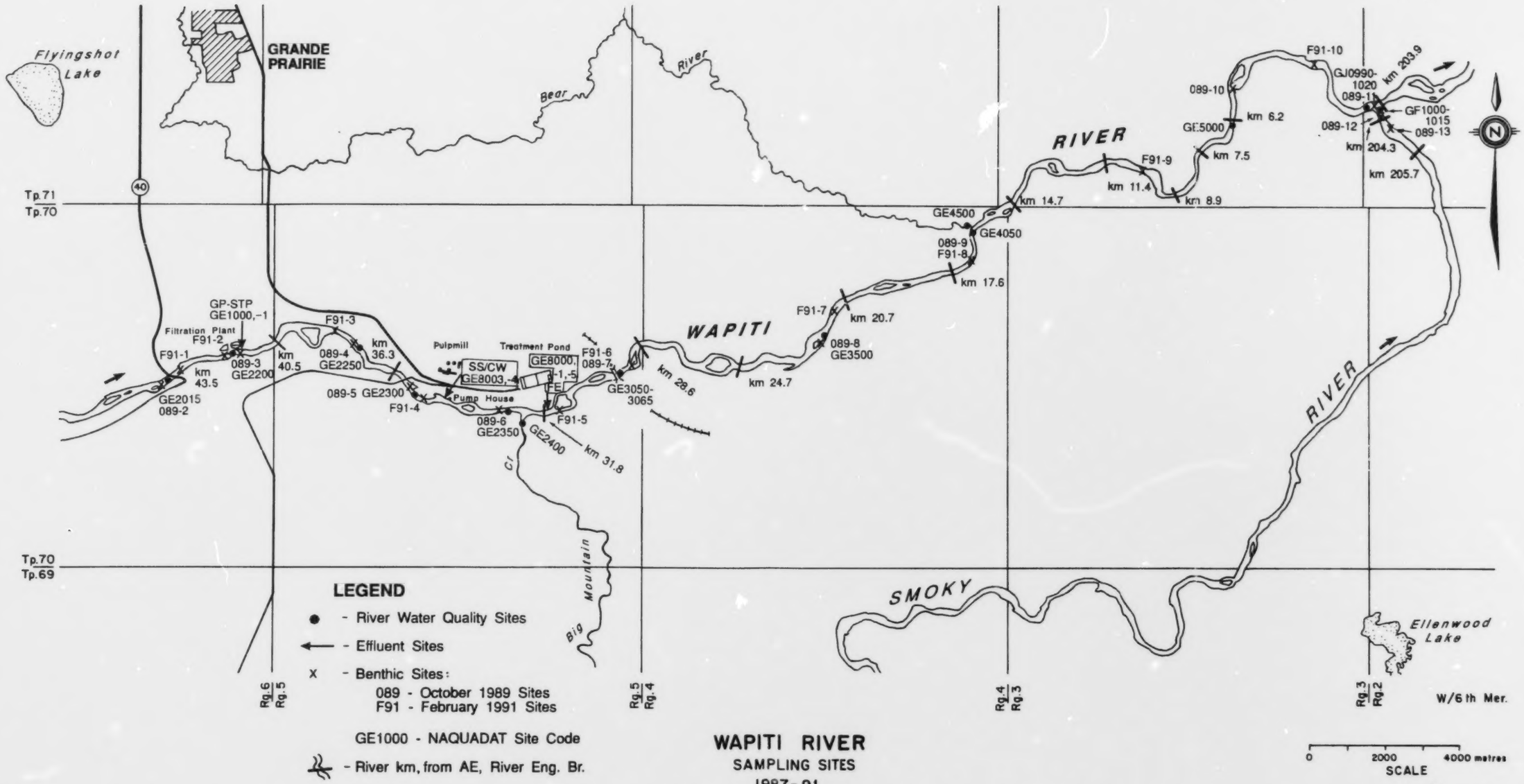

WAPITI RIVER
SAMPLING SITES
1987-91
ALBERTA

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APPENDIX 1. WATER QUALITY DATA FROM SYNOPTIC SURVEYS

- March 1989
- October 1989
- February-March 1990
- February-March 1991

WAPITI & SMOKY RIVER SURVEY: MARCH 1989

STATION	CODE	D	M	Y	DISCHG M3/S 971**F	TEMP DEG.C 020**F	PH 103**F	COND US/CM 020**F	OXYGEN METER O2 081**F	OXYGEN WINKLR O2 081**L	NON FILT RES 104**L	TURB NTU 020**L	COLOUR TRUE REL UN 020**L	NON FILT RES 104**L	FILT RES 104**L	TDS CALCD 00205L	COND US/CM 020**L	ALK TOTAL CaCO3 101**L
WAPITI R AT HWY40BR-C	00AL07GE2015	1	3	89						12.5	L 4000		5	L 4000	210			159
WAPITI R AT HWY40BR-C	00AL07GE2015	1	3	89		0		250		11.9	L 4000		5	L 4000	210			162
WAPITI R AT HWY40BR-C	00AL07GE2015	1	3	89						12.5	L 4000		10	L 4000	210			161
WAPITI R AT HWY40BR-C	00AL07GE2015	6	3	89	4.95													
WAPITI R AT R R BR-LR	00AL07GE3060	2	3	89		0.5		900		11.6			250					
WAPITI R AT R R BR-LR	00AL07GE3060	2	3	89						11.6								
WAPT R 1KU BEAR R-C	00AL07GE4050	2	3	89		0		870		11	8.55		250	8.55	570			176
WAPT R 1KU BEAR R-C	00AL07GE4050	2	3	89						11								
WAPT R 1KU BEAR R-C	00AL07GE4050	2	3	89						11								
WAPT R U SMOKY R -C	00AL07GJ1000	3	3	89						8.4	6.49		250	6.49	570			179
WAPT R U SMOKY R -C	00AL07GJ1000	3	3	89		0		735		9								
WAPT R U SMOKY R -C	00AL07GJ1000	3	3	89						8.6								
SMKY R 1KU WAPTI R-C	00AL07GF1010	3	3	89		0		475		11.7	L 4000		10	L 4000	310			152
SMKY R 1KU WAPTI R-C	00AL07GF1010	3	3	89						11.1								
SMKY R 1KU WAPTI R-C	00AL07GF1010	3	3	89						11.3								
SMKY R 1KU WAPTI R-C	00AL07GF1010	6	3	89	15.5													
SIMONETTE R NR MOUTH	00AL07GF3500	3	3	89		0		650		11	1.3		20	1.3	430			342
SIMONETTE R NR MOUTH	00AL07GF3500	3	3	89						10.9								
SIMONETTE R NR MOUTH	00AL07GF3500	3	3	89						9.7								
SIMONETTE R NR MOUTH	00AL07GF3500	7	3	89	1.49													
SMKY R BEZANSON BR-C	00AL07GJ2020	4	3	89		0		600		9.9			70					171
SMKY R BEZANSON BR-C	00AL07GJ2020	4	3	89						9.8								
SMKY R BEZANSON BR-C	00AL07GJ2020	4	3	89						9.7								
SMKYR 1KU PUSKWAU R-C	00AL07GJ2030	5	3	89		0		600		8.8	2		100	2	370			174
SMKYR 1KU PUSKWAU R-C	00AL07GJ2030	5	3	89						8.7								
SMKYR 1KU PUSKWAU R-C	00AL07GJ2030	5	3	89						8.4								
SMKY R 25KU LSMKYR-C	00AL07GJ2050	6	3	89		0		610		7.7			100					
SMKY R 25KU LSMKYR-C	00AL07GJ2050	6	3	89						7.9								
SMKY R 25KU LSMKYR-C	00AL07GJ2050	6	3	89						8.1								
L SMOKY R NR MOUTH	00AL07GH1500	7	3	89		0		460		5.2	5.74		30	5.74	300			274
L SMOKY R NR MOUTH	00AL07GH1500	7	3	89						5.3								
L SMOKY R NR MOUTH	00AL07GH1500	7	3	89						5.1								
SMOKY R AT WATINO-C	00AL07GJ2060	7	3	89		0		600		7.6	5.34		60	5.34	360			184
SMOKY R AT WATINO-C	00AL07GJ2060	7	3	89						7.7								
SMOKY R AT WATINO-C	00AL07GJ2060	7	3	89						7.6								
SMOKY R AT WATINO-C	00AL07GJ2060	9	3	89	23.8													
SMOKY R SITE S6C-C	00AL07GJ4000	9	3	89		0		540		7.5			60					
SMOKY R SITE S6C-C	00AL07GJ4000	9	3	89						7.4								
SMOKY R SITE S6C-C	00AL07GJ4000	9	3	89						7.4								
SMOKY R NR MOUTH-C	00AL07GJ5000	9	3	89		0		540		7.6	3.1		60	3.1	360			192
SMOKY R NR MOUTH-C	00AL07GJ5000	9	3	89						7.3								
SMOKY R NR MOUTH-C	00AL07GJ5000	9	3	89						7.5								
GR PRAIR SEW EFFL GRB	21AL07GE1000	2	3	89		5.8	7.5	1154	2.5		5		36	5		617	1136	277
GR PRAIR SEW EFF COMP	21AL07GE1001	2	3	89	0.151													
P&G SECPND LAG EFFGRB	20AL07GE8000	2	3	89		20.7	7	6150	0.8									
P&G SECPND LAG EFFGRB	20AL07GE8000	3	3	89		20.6	7	6130	1									
P&G SECPND LAG EFFCMP	20AL07GE8001	2	3	89							236	149	2450	236		3851	6070	286
P&G SECPND LAG EFFCMP	20AL07GE8001	2	3	89	0.696													
P&G STORMSEW EFF GRAB	20AL07GE8003	2	3	89		20	8	235	8.5		L1			L1		88	171	36
P&G STORMSEW EFF COMP	20AL07GE8004	2	3	89	0.051													

STATION	CODE	D	M	Y	HARDNS TOTAL CaCO3 106**L	PH 103**L	Na DISS 111**L	K DISS 191**L	Ca DISS 201**L	Mg DISS 121**L	HCO3 LAB CALCD 06202L	CO3 LAB CALCD 06302L	Cl DISS 172**L	SO4 DISS 163**L	F DISS 091**L	SILICA REACT SIO2 141**L	Be DISS 041**L	B DISS 051**L
WAPITI R AT HWY40BR-C	00AL07GE2015	1	3	89	195 24	7 85	4 4	0 39	56 2	13 3	193 82	L 5000	0 9	36		3 54		
WAPITI R AT HWY40BR-C	00AL07GE2015	1	3	89	197 24	7 88	4 5	0 48	57	13 3	197 48	L 5000	0 9	36 7		3 6		
WAPITI R AT HWY40BR-C	00AL07GE2015	1	3	89	196 4	7 88	4 5	0 41	56 5	13 4	196 26	L 5000	0 9	36 5		3 6		
WAPITI R AT R R BR-LR	00AL07GE3060	2	3	89														
WAPT R 1KU BEAR R-C	00AL07GE4050	2	3	89		7 67	81 5	2 05	80 5	14 3	215	L 5000	114	113		4 35		
WAPT R U SMOKY R -C	00AL07GJ1000	3	3	89		7 9	81 5	2 2	81 5	14 6	218	L 5000	111	105		4 5		
WAPT R U SMOKY R -C	00AL07GJ1000	3	3	89														
SMKY R 1KU WAPTI R-C	00AL07GF1010	3	3	89		7 98	6 3	0 6	65 5	19 4	186	L 5000	1 3	98		4 12		
SIMONETTE R NR MOUTH	00AL07GF3500	3	3	89		8 1	32	1 81	91 5	18 5	418	L 5000	1 3	30 7		9 85		
SMKY R BEZANSON BR-C	00AL07GJ2020	4	3	89	257 41	7 87	31 8	1 02	73	18 2	208 45	L 5000	41 6	111		4 6		
SMKYR 1KU PUSKWAU R-C	00AL07GJ2030	5	3	89	261 97	7 71	32 5	1 2	74	18 7	212 11	L 5000	41	97		4 55		
SMKY R 25KU LSMKYR-C	00AL07GJ2050	6	3	89														
L SMOKY R NR MOUTH	00AL07GH1500	7	3	89	231 03	7 99	28 5	1 8	66 4	15 8	334 01	L 5000	2 7	15		11 8		
SMOKY R AT WATINO-C	00AL07GJ2060	7	3	89	255 73	7 91	29 5	1 2	72	18 4	224 3	L 5000	30 3	101		5 4		
SMOKY R SITE S6C-C	00AL07GJ4000	9	3	89														
SMOKY R NR MOUTH-C	00AL07GJ5000	9	3	89	248 75	8 13	31 1	1 3	72 5	16 4	234 05	L 5000	31 4	93 5		5 5		
GR PRAIR SEW EFFL GRB	21AL07GE1000	2	3	89	231	7 66	122	12	63	18	338		0 019	98	1	10 1	L0 001	0 244
P&G SECPND LAG EFFGRB	20AL07GE8000	2	3	89														
P&G SECPND LAG EFFGRB	20AL07GE8000	3	3	89														
P&G SECPND LAG EFFCMP	20AL07GE8001	2	3	89	990	7 34	1010	17	365	19	349		0 112	908	0 15	11 7	L 001	
P&G STORMSEW EFF GRAB	20AL07GE8003	2	3	89	52	7 62	6	0 7	11	6	44		0 051	39	0 1	1 6	L0 001	

STATION	CODE	D	M	Y	Al EXT 130**L	V TOTAL 230**L	Cr TOTAL 240**L	Mn TOTAL 250**L	Mn EXT 253**L	Fe TOTAL 260**L	Fe EXT 263**L	Co TOTAL 270**L	Ni TOTAL 280**L	Cu TOTAL 290**L	Cu EXT 293**L	Zn TOTAL 300**L	Zn EXT 303**L	As TOTAL 330**L	Se TOTAL 340**L
WAPITI R AT HWY40BR-C	00AL07GE2015	1	3	89	0 03				0 01		L 0100				0 001		0 007		
WAPITI R AT HWY40BR-C	00AL07GE2015	1	3	89	0 01				0 004		L 0100				L 0010		0 005		
WAPITI R AT HWY40BR-C	00AL07GE2015	1	3	89	0 03				0 008		0 04				L 0010		0 005		
WAPITI R AT R R BR-LR	00AL07GE3060	2	3	89	0 13				0 15		0 18				0 001		0 014		
WAPT R 1KU BEAR R-C	00AL07GE4050	2	3	89	0 09				0 12		0 12				0 001		0 018		
WAPT R U SMOKY R -C	00AL07GJ1000	3	3	89	0 09				0 1		0 14				0 001		0 014		
SMKY R 1KU WAPTI R-C	00AL07GF1010	3	3	89	0 01				0 005		0 02				L 0010		0 002		
SIMONETTE R NR MOUTH	00AL07GF3500	3	3	89	0 01				0 14		0 39				0 001		0 004		
SMKY R BEZANSON BR-C	00AL07GJ2020	4	3	89	0 03				0 04		0 17				L 0010		0 008		
SMKYR 1KU PUSKWAU R-C	00AL07GJ2030	5	3	89	0 03				0 018		0 06				L 0010		0 008		
L SMOKY R NR MOUTH	00AL07GH1500	7	3	89	0 02				0 028		0 34				0 002		0 003		
SMOKY R AT WATINO-C	00AL07GJ2060	7	3	89	0 03				0 014		0 09				0 001		0 006		
SMOKY R NR MOUTH-C	00AL07GJ5000	9	3	89	0 02				0 016		0 13				0 002		0 005		
GR PRAIR SEW EFFL GRB	21AL07GE1000	2	3	89	0 013	0 004	0 006	0 092		0 226		0 002	0 007	0 006		0 028		0 0016	
P&G SECPND LAG EFFCMP	20AL07GE8001	2	3	89	0 15	0 01	0 131	0 835		0 621		0 005	0 011	0 008		0 163		0 001	L 0001
P&G STORMSEW EFF GRAB	20AL07GE8003	2	3	89	0 19	0 002	0 005	0 001		0 015		L0 001	0 001	0 001		0 004		L 0001	

STATION	CODE	D	M	Y	Mo TOTAL 420**L	Cd TOTAL 480**L	Cd EXT 483**L	Ba TOTAL 560**L	Hg TOTAL 800**L	Pb EXT 82302L	N PARTIC 079**L	N TKN 070**L	N TOTAL NH3 075**L	N DISS NO2 NO3 071**L	N DISS NO3 073**L	N DISS NO2 072**L	P TOTAL 150**L	P TOTAL 154**L	P DISS 151**L
WAPITI R AT HWY40BR-C	00AL07GE2015	1	3	89			L 0010			L 002		0 3	L 0100	0 084			0 003		
WAPITI R AT HWY40BR-C	00AL07GE2015	1	3	89			L 0010			L 002		0 18	L 0100				0 006		
WAPITI R AT HWY40BR-C	00AL07GE2015	1	3	89			L 0010			0 002		0 16	L 0100	0 088			0 005		
WAPITI R AT HWY40BR-C	00AL07GE2015	1	3	89								0 16	L 0100				0 004		
WAPITI R AT HWY40BR-C	00AL07GE2015	1	3	89								0 2	L 0100	0 094			L 0030		
WAPITI R AT HWY40BR-C	00AL07GE2015	1	3	89								0 2	L 0100				0 003		
WAPITI R AT R R BR-LR	00AL07GE3060	2	3	89			0 001			L 002		1 48	0 23	0 119			0 224		
WAPITI R AT R R BR-LR	00AL07GE3060	2	3	89									0 22	0 117					
WAPITI R AT R R BR-LR	00AL07GE3060	2	3	89									0 24	0 117					
WAPT R 1KU BEAR R-C	00AL07GE4050	2	3	89			L 0010			L 002		1 2	0 24	0 115			0 23		
WAPT R 1KU BEAR R-C	00AL07GE4050	2	3	89									0 26	0 113					
WAPT R 1KU BEAR R-C	00AL07GE4050	2	3	89									0 26	0 115					
WAPT R U SMOKY R -C	00AL07GJ1000	3	3	89			0 001			L 002		1 28	0 28	0 175			0 21		
WAPT R U SMOKY R -C	00AL07GJ1000	3	3	89									0 3	0 17					
WAPT R U SMOKY R -C	00AL07GJ1000	3	3	89									0 29	0 178					
SMKY R 1KU WAPTI R-C	00AL07GF1010	3	3	89			L 0010			L 002		0 2	L 0100	0 108			L 0030		
SMKY R 1KU WAPTI R-C	00AL07GF1010	3	3	89									L 0100	0 105					
SMKY R 1KU WAPTI R-C	00AL07GF1010	3	3	89									L 0100	0 107					
SIMONETTE R NR MOUTH	00AL07GF3500	3	3	89			L 0010			L 002		0 42	0 07	0 14			0 004		
SIMONETTE R NR MOUTH	00AL07GF3500	3	3	89									0 07	0 144					
SIMONETTE R NR MOUTH	00AL07GF3500	3	3	89									0 07	0 149					
SMKY R BEZANSON BR-C	00AL07GJ2020	4	3	89			L 0010			L 002		0 56	0 12	0 135			0 065		
SMKY R BEZANSON BR-C	00AL07GJ2020	4	3	89									0 12	0 132					
SMKY R BEZANSON BR-C	00AL07GJ2020	4	3	89									0 13	0 133					
SMKYR 1KU PUSKWAU R-C	00AL07GJ2030	5	3	89			L 0010			L 002		0 44	0 13	0 141			0 064		
SMKYR 1KU PUSKWAU R-C	00AL07GJ2030	5	3	89									0 14	0 147					
SMKYR 1KU PUSKWAU R-C	00AL07GJ2030	5	3	89									0 13	0 144					
SMKY R 25KU LSMKYR-C	00AL07GJ2050	6	3	89								0 48	0 16	0 126			0 058		
SMKY R 25KU LSMKYR-C	00AL07GJ2050	6	3	89									0 16	0 129					
SMKY R 25KU LSMKYR-C	00AL07GJ2050	6	3	89									0 19	L 134					
L SMOKY R NR MOUTH	00AL07GH1500	7	3	89			L 0010			L 002		0 6	0 12	0 15			0 022		
L SMOKY R NR MOUTH	00AL07GH1500	7	3	89									0 11	0 149					
L SMOKY R NR MOUTH	00AL07GH1500	7	3	89									0 12	0 15					
SMOKY R AT WATINO-C	00AL07GJ2060	7	3	89			L 0010			L 002		0 48	0 13	0 132			0 05		
SMOKY R AT WATINO-C	00AL07GJ2060	7	3	89									0 12	0 131					
SMOKY R AT WATINO-C	00AL07GJ2060	7	3	89									0 12	0 132					
SMOKY R SITE S6C-C	00AL07GJ4000	9	3	89								0 5	0 16	0 141			0 048		
SMOKY R SITE S6C-C	00AL07GJ4000	9	3	89									0 15	0 144					
SMOKY R SITE S6C-C	00AL07GJ4000	9	3	89									0 15	0 143					
SMOKY R NR MOUTH-C	00AL07GJ5000	9	3	89			L 0010			L 002		0 34	0 15	0 15			0 046		
SMOKY R NR MOUTH-C	00AL07GJ5000	9	3	89									0 15	0 144					
SMOKY R NR MOUTH-C	00AL07GJ5000	9	3	89									0 15	0 144					
GR PRAIR SEW EFFL GRB	21AL07GE1000	2	3	89	0 002	0 002		0 037	L 0001	0 003	0 29	16	13 6	1 88	1 8	0 019		5 9	5
P&G SECPND LAG EFFCMP	20AL07GE8001	2	3	89	0 006	0 005		0 167	L 0001	L 002	11 48	10	1 8	0 12	0 03	0 112		2 02	0 52
P&G SECPND LAG EFFCMP	20AL07GE8001	2	3	89									1 7	0 17	0 01	0 16			
P&G STORMSEW EFF GRAB	20AL07GE8003	2	3	89	L0 001	L0 001		0 022	L 0001	0 19	L0 02	0 32	0 1	0 24	0 274	0 051		0 01	

STATION	CODE	D	M	Y	CARBON TOTAL ORG 060**L	CARBON PARTIC TOTAL 06905L	CARBON DISS ORG 061**L	CARBON DISS INORG 061**L	BOD 5 DAY 082**L	COD TOTAL 083**L	OIL AND GREASE 065**L	PHENOL 065**L	TANNIN AND LIGNIN 065**L	COLI TOTAL NO/DL 360**L	COLI FECAL NO/DL 360**L
WAPITI R AT HWY40BR-C	00AL07GE2015	1	3	89	1.4		1.1		1.5	8.5		0.002	0.2	6	L1.000
WAPITI R AT HWY40BR-C	00AL07GE2015	1	3	89	1.3		1.2			L5.000				L1.000	L1.0
WAPITI R AT HWY40BR-C	00AL07GE2015	1	3	89	1.4		1.3		1.7	L5.000		0.001	0.3	8	L1.000
WAPITI R AT HWY40BR-C	00AL07GE2015	1	3	89	1.5		1.4			L5.000					
WAPITI R AT HWY40BR-C	00AL07GE2015	1	3	89	1.4		1.3		0.3	L5.000		L.0010	0.3		
WAPITI R AT HWY40BR-C	00AL07GE2015	1	3	89	1.4		1.4			L5.000					
WAPITI R AT R R BR-LR	00AL07GE3060	2	3	89	24		23.5		9.2	56		0.069	9.9	1760	130
WAPITI R AT R R BR-LR	00AL07GE3060	2	3	89					9.6						
WAPITI R AT R R BR-LR	00AL07GE3060	2	3	89					9.4						
WAPT R 1KU BEAR R-C	00AL07GE4050	2	3	89	22.7		21.9		8.3	51		0.072	10.1	12200	20
WAPT R 1KU BEAR R-C	00AL07GE4050	2	3	89					7.9						
WAPT R 1KU BEAR R-C	00AL07GE4050	2	3	89					8.3						
WAPT R U SMOKY R -C	00AL07GJ1000	3	3	89	22.9		22.4		5.7	47		0.044	9	530	10
WAPT R U SMOKY R -C	00AL07GJ1000	3	3	89					5.7						
WAPT R U SMOKY R -C	00AL07GJ1000	3	3	89					6.3						
SMKY R 1KU WAPTI R-C	00AL07GF1010	3	3	89	1.1		1.1		1.3	8		L.0010	0.4	20	L1.000
SMKY R 1KU WAPTI R-C	00AL07GF1010	3	3	89					1.9						
SMKY R 1KU WAPTI R-C	00AL07GF1010	3	3	89					1.6						
SIMONETTE R NR MOUTH	00AL07GF3500	3	3	89	7.2		7.1		1.7	34		L0.001	0.8	60	30
SIMONETTE R NR MOUTH	00AL07GF3500	3	3	89					1.5						
SIMONETTE R NR MOUTH	00AL07GF3500	3	3	89					2.1						
SMKY R BEZANSON BR-C	00AL07GJ2020	4	3	89	8		7.8		2.6	29.2		0.013	3.4	90	L1.000
SMKY R BEZANSON BR-C	00AL07GJ2020	4	3	89					2.5						
SMKY R BEZANSON BR-C	00AL07GJ2020	4	3	89					2.6						
SMKYR 1KU PUSKWAU R-C	00AL07GJ2030	5	3	89	8.9		8.4		2.1	24		0.008	3.6	26	2
SMKYR 1KU PUSKWAU R-C	00AL07GJ2030	5	3	89					2.2						
SMKYR 1KU PUSKWAU R-C	00AL07GJ2030	5	3	89					2.1						
SMKY R 25KU LSMKYR-C	00AL07GJ2050	6	3	89	8.3		8.1		0.94	21.5		0.008	3.6	8	2
SMKY R 25KU LSMKYR-C	00AL07GJ2050	6	3	89					1						
SMKY R 25KU LSMKYR-C	00AL07GJ2050	6	3	89					0.78						
L SMOKY R NR MOUTH	00AL07GH1500	7	3	89	10		9.8		0.7	17		L.0010	1	6	2
L SMOKY R NR MOUTH	00AL07GH1500	7	3	89					0.5						
L SMOKY R NR MOUTH	00AL07GH1500	7	3	89					0.8						
SMOKY R AT WATINO-C	00AL07GJ2060	7	3	89	7.7		7.7		1.4	17		0.011	3.1	6	L1.000
SMOKY R AT WATINO-C	00AL07GJ2060	7	3	89					1.2						
SMOKY R AT WATINO-C	00AL07GJ2060	7	3	89					1.5						
SMOKY R SITE S6C-C	00AL07GJ4000	9	3	89	8		7.7		0.6	9		0.011	2.7	L1.000	L1.000
SMOKY R SITE S6C-C	00AL07GJ4000	9	3	89					1.5						
SMOKY R SITE S6C-C	00AL07GJ4000	9	3	89					1						
SMOKY R NR MOUTH-C	00AL07GJ5000	9	3	89	7.9		7.7		0.8	16		0.013	2.7	2	L1.000
SMOKY R NR MOUTH-C	00AL07GJ5000	9	3	89					0.9						
SMOKY R NR MOUTH-C	00AL07GJ5000	9	3	89					1.1						
GR PRAIR SEW EFFL GRB	21AL07GE1000	2	3	89		3.19	14.4	64.3	10.3	45	0.78	0.017	1.74	16400	4700
P&G SECPND LAG EFFCMP	20AL07GE8001	2	3	89		142	334	66.2	87	1180	1.86	1.25	87	1300	400
P&G SECPND LAG EFFCMP	20AL07GE8001	2	3	89					75						
P&G STORMSEW EFF GRAB	20AL07GE8003	2	3	89		0.87	0.9	9.9	1.8	L4	0.22	0.001	L0.05		

Results as mg/L unless noted ** - more than one analytical code may be included; k - kilometre; u - upstream of; d - downstream of; L - left; C - centre; R - right; LR - left/right comp.; F - field measurement; L - lab analysis

WAPITI & SMOKY RIVER SURVEY: OCTOBER 1989

STATION	CODE	D	M	Y	DISCHG M3/S 971**F	TEMP DEG C 020**F	PH 103**F	COND US/CM 020**F	OXYGEN METER O2 081**F	TURB NTU 020**L	COLOUR TRUE REL UN 020**L	ODOUR THRESH NO 02001L	NON FILT RES 104**L	FILT RES 104**L	COND US/CM 020**L
WAPT R 5KU REDWI R-C	00AL07GC1000	2	10	89		7.2	8.5	314	10.7	34	30	1	22	176	315
WAPITI R AT HWY40BR-C	00AL07GE2015	2	10	89		8.9	8.7	325	10.4	42	30	1	30	180	324
WAPITI R AT HWY40BR-C	00AL07GE2015	2	10	89						41	30	1	28	180	326
WAPITI R AT HWY40BR-C	00AL07GE2015	2	10	89						42	30	1	28.7	179	323
WAPITI R AT HWY40BR-C	00AL07GE2015	3	10	89	66.9										
WAPT R 5KD GR P STP-R	00AL07GE2250	3	10	89		7.4	8.2	322	10.8	30	30	1	19	180	330
WAPT R D P&G HAULRD-C	00AL07GE2300	3	10	89		8.3	8.5	321	10.6						
WAPT R 1KU P&G EFL-LC	00AL07GE2350	3	10	89		7.2	8.4	326	10.3	34	30	1	29.6	181	334
BIG MTN CK NR MOUTH	00AL07GE2400	3	10	89	4.66	7.1	8.2	293	11.2	215	200	1	305	169	299
WAPITI R AT R R BR-L	00AL07GE3050	3	10	89		9.1	8.3	379	10.8						
WAPITI R AT R R BR-LC	00AL07GE3052	3	10	89		8.8	8.6	377	10.8						
WAPITI R AT R R BR-C	00AL07GE3054	3	10	89		8.7	8.4	376	10.7						
WAPITI R AT R R BR-RC	00AL07GE3056	3	10	89		8.7	8.3	371	10.7						
WAPITI R AT R R BR-LR	00AL07GE3060	3	10	89						44	60	1	41.4	205	377
WAPITI R AT R R BR-R	00AL07GE3065	3	10	89		8.6	8.1	369	10.6						
WAPT R10KD P&G EFL-RC	00AL07GE3500	3	10	89		9.1	8.4	375	10.5		60	1			
WAPT R 1KU BEAR R-C	00AL07GE4050	4	10	89		8.1	8.2	375	10.3	32	60	1	18	205.9	379
BEAR R NR MOUTH-C	00AL07GE4500	3	10	89	2.23										
BEAR R NR MOUTH-C	00AL07GE4500	4	10	89		6.5	8.2	368	10.7	156	100	1	141	226.5	375
WAPT R 6K U MOUTH-C	00AL07GE5000	4	10	89		8.1	8.2	374	10		60	2			
WAPT R U SMOKY R -C	00AL07GJ1000	4	10	89		8.2	8.2	374	10.7	48	60	1	38.4	206.1	378
SMOKY R U WAPITI R-L	00AL07GF1005	4	10	89		7.5	8.1	325	10.9						
SMOKY R U WAPITI R-R	00AL07GF1015	4	10	89		7.6	8.1	324	10.9	25	30	1	21.2	177.5	329
SIMONETTE R NR MOUTH	00AL07GF3500	3	10	89	28.7										
SIMONETTE R NR MOUTH	00AL07GF3500	4	10	89		7.8	8.3	341	10.8	98	100	1	90	190.4	347
SMKY R BEZANSON BR-C	00AL07GJ2020	5	10	89		6.7	8.3	343	11.3	37	40	1	38	191.3	351
SMKYR 1KU PUSKWAU R-C	00AL07GJ2030	5	10	89		7	8.2	346	11.4						
PUSKWASKAU R NR MTH-C	00AL07GJ2032	5	10	89	0.547	4.2	8.3	373	12.1	28	100	1	64	215.8	262
BAD HEART R NR MTH-C	00AL07GJ2034	5	10	89	0.753	4	8.7	536	12.2	138	150	1	174	322.4	547
L SMOKY R NR MOUTH	00AL07GH1500	5	10	89	33	6.8	8.3	257	11	63	150	1	24	142.6	383
SMOKY R AT WATINO-C	00AL07GJ2060	5	10	89	254	7.2	8.2	334	11.2	52	40	1	47.5	183.9	339
SMOKY R NR MOUTH-C	00AL07GJ5000	5	10	89		8.5	8.2	348	11.7	42	40	1	45	194.3	356
GR PRAIR SEW EFFL GRB	21AL07GE1000	2	10	89	0.214										
GR PRAIR SEW EFFL GRB	21AL07GE1000	3	10	89		12.6	7.6	968	3	18	40	1	6.1	536	962
GR PRAIR SEW EFFL GRB	21AL07GE1000	3	10	89	0.214						30	1	2		
GR PRAIR SEW EFFL GRB	21AL07GE1000	2	10	89	0.214										
GR PRAIR SEW EFFL GRB	21AL07GE1000	3	10	89		12.6	7.6	968	3	18	40	1	6.1		
GR PRAIR SEW EFFL GRB	21AL07GE1000	3	10	89	0.214						30	1	2		
P&G SECPND LAG EFFGRB	20AL07GE8000	2	10	89	0.713										
P&G SECPND LAG EFFGRB	20AL07GE8000	3	10	89		25.5	7	4220	0.3						
P&G SECPND LAG EFFCMP	20AL07GE8001	2	10	89							2388	512			
P&G SECPND LAG EFFCMP	20AL07GE8001	3	10	89						60	2000	32	144	2742	4350
P&G SECPND LAG EFFCMP	20AL07GE8001	3	10	89	0.749						2388	512			
P&G STORMSEW EFF GRAB	20AL07GE8003	3	10	89		21.2	7.5	359	8	500	20	1	941	198.6	361
P&G FOAM PND EFF GRAB	20AL07GE8005	3	10	89							858	256			
P&G FOAM PND EFF GRAB	20AL07GE8005	3	10	89		25.4	7.1	4210	5.3	60	2000	32	164	2742	4360
P&G FOAM PND EFF GRAB	20AL07GE8005	3	10	89							858	256			

STATION	CODE	D	M	Y	ALK TOTAL CaCO3 101°°L	HARDNS TOTAL CaCO3 106°°L	PH 103°°L	Na DISS 111°°L	K DISS 191°°L	Ca DISS 201°°L	Mg DISS 121°°L	HCO3 LAB CALCD 06202L	CO3 LAB CALCD 06302L	Cl DISS 172°°L	SO4 DISS 163°°L	F DISS 091°°L	SILICA REACT SIO2 141°°L	CN 066°°L	S- DISS 161°°L
WAPT R 5KU REDWI R-C	00AL07GC1000	2	10	89	151	165 1	8 2	6 3	0 85	47 8	11 1	185	L 5000	1	16 4	0 07	3 9	L 001	0 004
WAPITI R AT HWY40BR-C	00AL07GE2015	2	10	89	154	167 6	8 31	7	0 87	48 5	11 3	188	L 5000	0 8	17 5	0 1	3 9	L 0010	0 003
WAPITI R AT HWY40BR-C	00AL07GE2015	2	10	89	156	164 5	8 24	7 2	0 92	47 4	11 2	190	L 5000	0 7	17 2	0 1	3 84	L 0010	0 006
WAPITI R AT HWY40BR-C	00AL07GE2015	2	10	89	155	164 8	8 2	7	0 91	47 2	11 4	189	L 5000	0 7	17 4	0 11	3 8	L 0010	0 003
WAPT R 5KD GR P STP-R	00AL07GE2250	3	10	89	156	163 35	7 98	6 6	0 89	46 9	11 2	190 16	L 5000	1 6	17 6	0 11	3 84	L 0010	0 004
WAPT R D P&G HAULRD-C	00AL07GE2300	3	10	89															
WAPT R 1KU P&G EFL-LC	00AL07GE2350	3	10	89	155	165 1	8 02	7	0 9	47 6	11 2	188 95	L 5000	1 3	18 2	0 11	3 87	L 0010	0 016
BIG MTN CK NR MOUTH	00AL07GE2400	3	10	89	140	149 38	7 82	8 5	2 87	39 5	12 3	170 66	L 5000	5 5	14 5	0 1	6 3	0 001	0 015
WAPITI R AT R R BR-LR	00AL07GE3060	3	10	89	153	165 19	7 99	14 8	1 12	47 8	11 1	186 51	L 5000	11 9	25 1	0 11	4 05	L 0010	0 02
WAPT R 1KU BEAR R-C	00AL07GE4050	4	10	89	157	162 53	8 02	15 1	1 15	46 9	11	191 38	L 5000	11 8	24 4	0 1	4	L 0010	0 012
BEAR R NR MOUTH-C	00AL07GE4500	4	10	89	145	144 07	7 86	22 5	6 3	38 2	11 8	176 76	L 5000	32 3	26 6	0 16	8 56	L 0010	0 012
WAPT R U SMOKY R -C	00AL07GJ1000	4	10	89	156	163 35	8 04	15	1 28	46 9	11 2	190 16	L 5000	12 3	24 3	0 1	4 2	L 0010	0 014
SMOKY R U WAPITI R-R	00AL07GF1015	4	10	89	140	160 11	8 15	4 8	0 75	43 3	12 6	170 66	L 5000	1 2	29 8	0 11	3 64	L 0010	0 005
SIMONETTE R NR MOUTH	00AL07GF3500	4	10	89	173	168 04	8 13	8 2	1 78	49 6	10 7	210 89	L 5000	2 2	11 9	0 11	6 7	L 0010	0 01
SMKY R BEZANSON BR-C	00AL07GJ2020	5	10	89	152	167 63	8 06	8 5	1 04	46 8	12 3	185 29	L 5000	4 7	25 4	0 1	4 25	L 0010	0 008
PUSKWASKAU R NR MTH-C	00AL07GJ2032	5	10	89	153	173 67	8 06	14 3	3 95	47 9	13 1	186 51	L 5000	2 8	40 7	0 12	6 42		
BAD HEART R NR MTH-C	00AL07GJ2034	5	10	89	195	172 07	8 03	50 5	6	46 6	13 5	237 71	L 5000	7 1	79 5	0 17	7 66	L 0010	0 005
L SMOKY R NR MOUTH	00AL07GH1500	5	10	89	120	119 53	7 87	9 3	1 68	35 3	7 6	146 28	L 5000	3 5	12 2	0 09	5 06		
SMOKY R AT WATINO-C	00AL07GJ2060	5	10	89	146	156 26	8 07	8 8	1 33	43 9	11 3	177 97	L 5000	5	24 5	0 1	4 34	L 0010	0 007
SMOKY R NR MOUTH-C	00AL07GJ5000	5	10	89	150	162 16	8 1	10 5	1 3	45 6	11 7	182 85	L 5000	6 4	27 3	0 11	4 34	L 0010	0 006
GR PRAIR SEW EFFL GRB	21AL07GE1000	2	10	89							24 4	235	L 5000	93	116	0 92	7 25		
P&G SECPND LAG EFFGRB	20AL07GE8000	3	10	89															
P&G SECPND LAG EFFCMP	20AL07GE8001	2	10	89															1 77
P&G SECPND LAG EFFCMP	20AL07GE8001	3	10	89	192	746 33	7 54	654	10 4	274	14 9	234 05	L 5000	860	812	0 15	11 8	0 001	0 82
P&G SECPND LAG EFFCMP	20AL07GE8001	3	10	89															1 77
P&G STORMSEW EFF GRAB	20AL07GE8003	3	10	89	136	165 35	7 6	8 2	0 93	47 7	11 2	165 78	L 5000	1 9	45 6	L 0500	1 44	0 001	0 006
P&G FOAM PND EFF GRAB	20AL07GE8005	3	10	89															1 65
P&G FOAM PND EFF GRAB	20AL07GE8005	3	10	89	197	751 33	7 43	674	11 4	276	14 9	240 14	L 5000	870	775	0 15	12	0 001	0 59
P&G FOAM PND EFF GRAB	20AL07GE8005	3	10	89															1 65

STATION	CODE	D	M	Y	Li TOTAL 030°°L	Be TOTAL 04001L	B TOTAL 050°°L	Al TOTAL 130°°L	V TOTAL 230°°L	Cr TOTAL 240°°L	Mn TOTAL 25001L	Fe TOTAL 260°°L	Co TOTAL 270°°L	Ni TOTAL 28001L	Cu TOTAL 290°°L	Zn TOTAL 300°°L	As TOTAL 330°°L	Se TOTAL 340°°L
WAPT R 5KU REDWI R-C	00AL07GC1000	2	10	89	L 0050	L 0010	0 02	0 64	L 0010	0 003	0 023	1 16	L 0010	L 0010	0 003	0 003	0 0008	L 0002
WAPITI R AT HWY40BR-C	00AL07GE2015	2	10	89	L 0050	L 0010	0 01	0 77	0 003	0 002	0 023	1 54	L 0010	L 0010	0 003	0 005	0 0012	L 0002
WAPITI R AT HWY40BR-C	00AL07GE2015	2	10	89	L 0050	L 0010	0 02	0 93	0 002	0 003	0 029	1 61	L 0010	L 0010	0 003	0 006	0 0009	L 0002
WAPITI R AT HWY40BR-C	00AL07GE2015	2	10	89	L 0050	L 0010	0 01	0 56	0 002	0 001	0 024	1 6	L 0010	L 0010	0 003	0 003	0 001	L 0002
WAPT R 5KD GR P STP-R	00AL07GE2250	3	10	89	0 012	L 0010	0 08	0 56	L 0010	L 0010	0 021	1 11	L 0010	L 0010	0 003	0 002	0 0007	L 0002
WAPT R 1KU P&G EFL-LC	00AL07GE2350	3	10	89	0 012	L 0010	0 03	0 77	0 002	0 002	0 024	1 27	L 0010	L 0010	0 005	0 003	0 0007	L 0002
BIG MTN CK NR MOUTH	00AL07GE2400	3	10	89	0 017	L 0010	0 06	0 76	0 015	0 007	0 18	9 62	0 003	0 015	0 013	0 013	0 0039	0 0005
WAPITI R AT R R BR-LR	00AL07GE3060	3	10	89	0 013	L 0010	0 11	0 78	0 001	0 005	0 045	1 8	L 0010	L 0010	0 005	0 004	0 0014	0 0002
WAPT R10KD P&G EFL-RC	00AL07GE3500	3	10	89				0 96			0 043	1 79			0 005	0 007		
WAPT R 1KU BEAR R-C	00AL07GE4050	4	10	89	0 012	L 0010	0 03	0 67	L 0010	0 006	0 036	1 21	L 0010	0 008	0 004	0 012	0 0007	L 0002
BEAR R NR MOUTH-C	00AL07GE4500	4	10	89	0 015	L 0010	0 1	1 46	0 015	0 008	0 1	6 95	L 0010	0 016	0 012	0 032	0 0075	0 0007
WAPT R 6K U MOUTH-C	00AL07GE5000	4	10	89				1 31			0 054	2 84			0 006	0 02		
WAPT R U SMOKY R -C	00AL07GJ1000	4	10	89	0 012	L 0010	0 02	0 97	0 004	0 006	0 041	1 91	L 0010	0 008	0 005	0 012	0 0011	L 0002
SMOKY R U WAPITI R-R	00AL07GF1015	4	10	89	0 011	L 0010	0 02	0 43	0 002	0 004	0 015	0 86	L 0010	0 007	L 0010	0 009	0 0005	L 0002
SIMONETTE R NR MOUTH	00AL07GF3500	4	10	89	0 015	L 0010	0 05	1 48	0 006	0 005	0 078	4 27	0 004	0 01	0 008	0 014	0 0026	L 0002
SMKY R BEZANSON BR-C	00AL07GJ2020	5	10	89	0 014	L 0010	0 03	0 64	L 0010	0 003	0 031	1 63	L 0010	0 006	L 0010	0 01	0 0008	0 0002
PUSKWASKAU R NR MTH-C	00AL07GJ2032	5	10	89	0 023	L 0010	0 03	0 81	0 003	0 003	0 099	4 02	L 0010	0 01	0 006	0 012	0 0039	L 0002
BAD HEART R NR MTH-C	00AL07GJ2034	5	10	89	0 027	L 0010	0 15	4 03	0 018	0 005	0 13	8 34	0 004	0 016	0 01	0 022	0 0056	0 0005
L SMOKY R NR MOUTH	00AL07GH1500	5	10	89	0 014	L 0010	0 01	0 36	L 0010	0 004	0 03	1 66	L 0010	0 007	0 004	0 008	0 0014	L 0002
SMOKY R AT WATINO-C	00AL07GJ2060	5	10	89	0 015	L 0010	0 03	0 95	0 003	0 004	0 037	2 35	0 004	0 008	0 006	0 012	0 0011	0 0002
SMOKY R NR MOUTH-C	00AL07GJ5000	5	10	89	0 016	L 0010	0 03	1 03	0 007	0 006	0 046	2 81	0 004	0 01	0 008	0 014	0 0013	L 0002
GR PRAIR SEW EFFL GRB	21AL07GE1000	2	10	89	0 005	L 0010	0 22	0 03	0 001	0 001	0 018	0 13	L 0010	L 0010	0 004	0 015	0 0015	0 0004
P&G SECPND LAG EFFCMP	20AL07GE8001	3	10	89	0 028	L 0010	0 03	0 4	0 016	0 38	0 92	1 08	L 0010	0 002	0 006	0 1	0 0008	L 0002
P&G STORMSEW EFF GRAB	20AL07GE8003	3	10	89	0 038	L 0010	0 05	100	0 028	0 014	0 04	18 2	0 008	0 035	0 03	0 068	0 0095	0 001
P&G FOAM PND EFF GRAB	20AL07GE8005	3	10	89	0 026	L 0010	0 03	0 46	L 0010	0 36	0 87	1 04	L 0010	L 0010	0 005	0 1	0 002	L 0002

STATION	CODE	D	M	Y	Sr TOTAL 380°°L	Mo TOTAL 420°°L	Ag TOTAL 470°°L	Cd TOTAL 480°°L	Sb TOTAL 510°°L	Ba TOTAL 560°°L	Hg TOTAL UG/L 800°°L	Pb TOTAL 820°°L	COLI TOTAL NO/DL 360°°L	COLI FECAL NO/DL 360°°L	CHLORO PHYLLa MG/M3 067°°L	CHLOROa EPLITH MG/M2 067°°L
WAPT R 5KU REDWI R-C	00AL07GC1000	2	10	89	0.21	0.003	L 0.010	0.001	L 0.002	0.13	L 0.500	L 0.020	84	4	0.2	L1
WAPITI R AT HWY40BR-C	00AL07GE2015	2	10	89	0.21	L 0.010	L 0.010	L 0.010	L 0.002	0.13	L 0.500	L 0.020	60	32	0.3	L1
WAPITI R AT HWY40BR-C	00AL07GE2015	2	10	89	0.22	0.008	L 0.010	L 0.010	L 0.002	0.14	L 0.500	L 0.020	100	12	0.3	
WAPITI R AT HWY40BR-C	00AL07GE2015	2	10	89	0.22	0.001	L 0.010	L 0.010	L 0.002	0.14	L 0.500	L 0.020	148	12	0.3	
WAPT R 1KU GR P STP-R	00AL07GE2200	2	10	89												L1
WAPT R 5KD GR P STP-R	00AL07GE2250	3	10	89	0.21	0.003	L 0.010	L 0.010	L 0.002	0.12	L 0.500	L 0.020	88	20	0.4	L1
WAPT R D P&G HAULRD-C	00AL07GE2300	3	10	89												4.379
WAPT R 1KU P&G EFL-LC	00AL07GE2350	3	10	89	0.21	0.002	L 0.010	L 0.010		0.13		L 0.020	72	20	0.4	L1
BIG MTN CK NR MOUTH	00AL07GE2400	3	10	89	0.2	0.038	L 0.010	L 0.010	L 0.002	0.17		0.003	188	100	2.6	
WAPITI R AT R R BR-C	00AL07GE3054	3	10	89												1.215
WAPITI R AT R R BR-LR	00AL07GE3060	3	10	89	0.21	L 0.010	L 0.010	L 0.010	L 0.002	0.13	L 0.500	L 0.020	68	24	0.4	
WAPT R10KD P&G EFL-RC	00AL07GE3500	3	10	89								L 0.020				2.446
WAPT R 1KU BEAR R-C	00AL07GE4050	4	10	89	0.21	0.005	L 0.010	L 0.010		0.12	L 0.500	L 0.020	45	16	1.3	2.031
BEAR R NR MOUTH-C	00AL07GE4500	4	10	89	0.17	0.019	L 0.010	L 0.010	L 0.002	0.15	L 0.500	0.01	530	176	5.2	
WAPT R 6K U MOUTH-C	00AL07GE5000	4	10	89								L 0.020				2.466
WAPT R U SMOKY R -C	00AL07GJ1000	4	10	89	0.21	0.008	L 0.010	L 0.010		0.13		L 0.020	100	16	0.8	3.826
SMOKY R U WAPITI R-L	00AL07GF1005	4	10	89												L1
SMOKY R U WAPITI R-R	00AL07GF1015	4	10	89	0.29	0.004	L 0.010	L 0.010		0.09	L 0.500	L 0.020	24	8	0.2	L1
SIMONETTE R NR MOUTH	00AL07GF3500	4	10	89	0.17	0.01	L 0.010	L 0.010	L 0.002	0.14	L 0.500	L 0.020	340	80	0.9	
SMKY R BEZANSON BR-C	00AL07GJ2020	5	10	89	0.28	0.007	L 0.010	L 0.010	L 0.002	0.13	L 0.500	L 0.020	124	15	0.6	2.915
SMKYR 1KU PUSKWAU R-C	00AL07GJ2030	5	10	89									208	27	0.6	L1
PUSKWASKAU R NR MTH-C	00AL07GJ2032	5	10	89	0.24	0.003	L 0.010	L 0.010	L 0.002	0.09		L 0.020	2900	75	3.8	
BAD HEART R NR MTH-C	00AL07GJ2034	5	10	89	0.3	0.016	L 0.010	L 0.010	0.0003	0.11		0.006	260	144	7.5	
L SMOKY R NR MOUTH	00AL07GH1500	5	10	89	0.14	0.003	L 0.010	L 0.010	L 0.002	0.08	L 0.500	L 0.020	63	12	3.3	
SMOKY R AT WATINO-C	00AL07GJ2060	5	10	89	0.26	0.008	L 0.010	L 0.010	L 0.002	0.13	L 0.500	0.005	140	36	1.6	5.273
SMOKY R NR MOUTH-C	00AL07GJ5000	5	10	89	0.27	0.008	L 0.010	L 0.010	L 0.002	0.14	L 0.500	0.004	350	27	1.6	
GR PRAIR SEW EFFL GRB	21AL07GE1000	2	10	89	0.28	0.004	L 0.010	L 0.010	L 0.002	0.03	L 0.500	0.002	11	100	L1	
GR PRAIR SEW EFFL GRB	21AL07GE1000	3	10	89										520		
P&G SECPND LAG EFFCMP	20AL07GE8001	3	10	89	0.37	0.012	L 0.010	0.002	L 0.002	0.42		L 0.020		L 10		
P&G STORMSEW EFF GRAB	20AL07GE8003	3	10	89	0.35	0.22	L 0.010	L 0.010		0.54		0.007	3100	50		
P&G FOAM PND EFF GRAB	20AL07GE8005	3	10	89	0.35	0.009	L 0.010	0.003	L 0.002	0.41		L 0.020		L 10		

STATION	CODE	D	M	Y	N TKN 070°°L	N TOTAL NH3 075°°L	N DISS NO2 NO3 071°°L	P TOTAL 150°°L	P DISS 151°°L	CARBON TOTAL ORG 060°°L	CARBON DISS ORG 061°°L	BOD 5 DAY 082°°L	BOD DISS 5 DAY 082°°L	COD TOTAL 083°°L	OIL AND GREASE 065°°L	PHENOL 065°°L	TANNIN AND LIGNIN 065°°L	SURFAC ANION MBAS 107°°L
WAPT R 5KU REDWI R-C	00AL07GC1000	2	10	89	0.46	0.01	L 0.030	0.031	0.003	6	5.7	0.6		L5 000	0.2	L 0.010	0.5	0.06
WAPITI R AT HWY40BR-C	00AL07GE2015	2	10	89	0.5	0.01	L 0.030	0.037	0.004	6.6	6.3	0.5	0.3	10	0.3	L 0.010	0.5	0.06
WAPITI R AT HWY40BR-C	00AL07GE2015	2	10	89	0.46	0.01	L 0.030	0.037	0.003	6.6	6.3	0.8	0.2	10	0.3	L 0.010	0.5	0.06
WAPITI R AT HWY40BR-C	00AL07GE2015	2	10	89	0.46	0.01	L 0.030	0.035	0.004	6.5	6.3	0.7		45	0.2	L 0.010	0.5	0.06
WAPT R 5KD GR P STP-R	00AL07GE2250	3	10	89	0.44	L 0.100	0.019	0.039	0.012	7.5	7.1	0.3		L5 000		0.001	0.7	0.06
WAPT R 5KD GR P STP-R	00AL07GE2250	3	10	89		L 0.100						0.4						
WAPT R 5KD GR P STP-R	00AL07GE2250	3	10	89		0.01						0.4						
WAPT R D P&G HAULRD-C	00AL07GE2300	3	10	89		L 0.100						0.6						
WAPT R D P&G HAULRD-C	00AL07GE2300	3	10	89		L 0.100						L 1.000						
WAPT R D P&G HAULRD-C	00AL07GE2300	3	10	89		L 0.100						0.4						
WAPT R 1KU P&G EFL-LC	00AL07GE2350	3	10	89	0.44	0.01	0.02	0.044	0.011	7.4	6.7	0.5	0.2	16	0.2	L 0.010	0.5	0.06
WAPT R 1KU P&G EFL-LC	00AL07GE2350	3	10	89		0.01						0.5	0.1					
WAPT R 1KU P&G EFL-LC	00AL07GE2350	3	10	89		0.01						0.4						
BIG MTN CK NR MOUTH	00AL07GE2400	3	10	89	3	0.04	0.005	0.33	0.027	32.2	31.4	1.2		51	0.8	0.003	3.1	0.13
BIG MTN CK NR MOUTH	00AL07GE2400	3	10	89		0.04						0.8						
WAPITI R AT R R BR-LR	00AL07GE3060	3	10	89	0.6	0.02	0.023	0.08	0.02	11	11	0.9	0.2	51	0.3	0.005	1.8	
WAPITI R AT R R BR-LR	00AL07GE3060	3	10	89		0.02						0.9	0.2					
WAPITI R AT R R BR-LR	00AL07GE3060	3	10	89		0.02						0.5						
WAPT R10KD P&G EFL-RC	00AL07GE3500	3	10	89	0.52	0.02	0.022	0.08	0.018	11.3	11.2	0.6		40.5		0.002	1.8	
WAPT R10KD P&G EFL-RC	00AL07GE3500	3	10	89		0.02						0.7						
WAPT R10KD P&G EFL-RC	00AL07GE3500	3	10	89		0.02						0.7						
WAPT R 1KU BEAR R-C	00AL07GE4050	4	10	89	0.58	0.02	0.019	0.058	0.017	11.3	11	0.7	0.3	16	0.2	0.004	1.9	0.1
WAPT R 1KU BEAR R-C	00AL07GE4050	4	10	89		0.02						0.8	L0.1					
WAPT R 1KU BEAR R-C	00AL07GE4050	4	10	89		0.02						0.4						
BEAR R NR MOUTH-C	00AL07GE4500	4	10	89	1.76	0.06	0.246	0.3	0.07	24.2	22.8	2.6		57	0.6	0.007	3	0.16
BEAR R NR MOUTH-C	00AL07GE4500	4	10	89		0.06						2.6						
WAPT R 6K U MOUTH-C	00AL07GE5000	4	10	89	0.58	0.03	0.022	0.102	0.019	12.2	11.6	0.8		29		0.004	2	
WAPT R 6K U MOUTH-C	00AL07GE5000	4	10	89		0.03						0.8						
WAPT R U SMOKY R -C	00AL07GJ1000	4	10	89	0.6	0.03	0.026	0.078	0.019	12.5	11.8	0.6	0.2	23	0.4	0.005	1.9	0.12
WAPT R U SMOKY R -C	00AL07GJ1000	4	10	89		0.03						0.7	0.4					
WAPT R U SMOKY R -C	00AL07GJ1000	4	10	89		0.03						0.5						

STATION	CODE	D	M	Y	N TKN 070**L	N TOTAL NH3 075**L	N DISS NO2 NO3 071**L	P TOTAL 150**L	P DISS 151**L	CARBON TOTAL ORG 060**L	CARBON DISS ORG 061**L	BOD 5 DAY 082**L	BOD DISS 5 DAY 082**L	COD TOTAL 083**L	OIL AND GREASE 065**L	PHENOL 065**L	TANNIN AND LIGNIN 065**L	SURFAC ANION MBAS 107**L
SMOKY R U WAPITI R-R	00AL07GF1015	4	10	89	0.4	0.01	L 0.030	0.03	0.003	5.9	5.7	L 1.000	L0.1	9	L 1.000	0.001	0.4	0.06
SMOKY R U WAPITI R-R	00AL07GF1015	4	10	89		0.01						L 1.000	L 1					
SMOKY R U WAPITI R-R	00AL07GF1015	4	10	89		0.01						L 1.000						
SIMONETTE R NR MOUTH	00AL07GF3500	4	10	89	0.92	0.03	L 0.030	0.116	0.012	18	17.5	0.5		40	0.2	0.003	1.8	0.11
SIMONETTE R NR MOUTH	00AL07GF3500	4	10	89		0.03						0.5						
SMKY R BEZANSON BR-C	00AL07GJ2020	5	10	89	0.46	0.02	0.006	0.048	0.01	8.9	8.8	0.9		37	L 1.000	L 0.010	1.2	0.07
SMKY R BEZANSON BR-C	00AL07GJ2020	5	10	89		0.02						0.8						
SMKY R BEZANSON BR-C	00AL07GJ2020	5	10	89		0.02						0.9						
SMKYR 1KU PUSKWAU R-C	00AL07GJ2030	5	10	89		0.02						0.8	0.7					
SMKYR 1KU PUSKWAU R-C	00AL07GJ2030	5	10	89		0.02						0.6						
PUSKWASKAU R NR MTH-C	00AL07GJ2032	5	10	89	1.18	0.05	0.009	0.132	0.043	30.3	29.5	1.1		78		0.007	3.1	
PUSKWASKAU R NR MTH-C	00AL07GJ2032	5	10	89		0.04						1.5						
BAD HEART R NR MTH-C	00AL07GJ2034	5	10	89	1.64	0.05	0.157	0.25	0.073	29.7	28.3	3.5		77	0.3	0.007	3.2	
BAD HEART R NR MTH-C	00AL07GJ2034	5	10	89		0.06						3						
L SMOKY R NR MOUTH	00AL07GH1500	5	10	89	0.72	0.03	0.008	0.06	0.017	17.1	17	0.8		39		0.003	1.8	
L SMOKY R NR MOUTH	00AL07GH1500	5	10	89		0.03						0.8						
L SMOKY R NR MOUTH	00AL07GH1500	5	10	89		0.03						1.1						
SMOKY R AT WATINO-C	00AL07GJ2060	5	10	89	0.52	0.02	0.009	0.068	0.01	10.8	10.7	0.7		37	0.2	L 0.010	1.2	0.09
SMOKY R AT WATINO-C	00AL07GJ2060	5	10	89		0.02						0.7	0.2					
SMOKY R AT WATINO-C	00AL07GJ2060	5	10	89		0.02						0.8						
SMOKY R NR MOUTH-C	00AL07GJ5000	5	10	89	0.5	0.02	0.01	0.075	0.009	10.2	10	0.3		41	0.3	0.001	1.1	0.08
SMOKY R NR MOUTH-C	00AL07GJ5000	5	10	89		0.02						0.4						
SMOKY R NR MOUTH-C	00AL07GJ5000	5	10	89		0.02						0.2						
GR PRAIR SEW EFFL GRB	21AL07GE1000	2	10	89	2.44	1.12	5.9	3	2.8	11.1	11.1	2.5	0.9	40	1.4	0.003	1	0.35
GR PRAIR SEW EFFL GRB	21AL07GE1000	3	10	89	2.74	1.32	6.6	3	2.8	12	11.9	2.8	0.6	20	0.6	0.005	1.1	0.37
P&G SECPND LAG EFFCMP	20AL07GE8001	2	10	89		0.495										0.728		
P&G SECPND LAG EFFCMP	20AL07GE8001	3	10	89	10.2	0.42	0.1	1.76	1.08	211	196	39.4	11.3	500	2	0.31	45	3.6
P&G SECPND LAG EFFCMP	20AL07GE8001	3	10	89		0.42						43.5	11.8					
P&G SECPND LAG EFFCMP	20AL07GE8001	3	10	89		0.88						42.2	15.1					
P&G SECPND LAG EFFCMP	20AL07GE8001	3	10	89		0.495										0.728		
P&G STORMSEW EFF GRAB	20AL07GE8003	3	10	89	3.88	0.09	0.029	0.56	0.006	9.8	5.8	2.2		83.5	2.3	0.004	0.3	0.07
P&G STORMSEW EFF GRAB	20AL07GE8003	3	10	89		0.09						1.7						
P&G FOAM PND EFF GRAB	20AL07GE8005	3	10	89		0.825										0.658		
P&G FOAM PND EFF GRAB	20AL07GE8005	3	10	89	10.3	0.66	0.11	1.69	1.03	215	203	51.5		848	2.6	0.25	46	3.6
P&G FOAM PND EFF GRAB	20AL07GE8005	3	10	89		0.66						45						
P&G FOAM PND EFF GRAB	20AL07GE8005	3	10	89		0.825										0.658		

Results as mg/L unless noted ** - more than one analytical code may be included. k - kilometre, u - upstream of, d - downstream of, L - left, C - centre, R - right, LR - left/right comp., F - field measurement, L - lab analysis

WAPITI & SMOKY RIVER SURVEY: FEBRUARY-MARCH 1990

STATION	CODE	D	M	Y	DISCHG M3/S 971**F	TEMP DEG C 020**F	PH 103**F	COND US/CM 020**F	OXYGEN METER O2 081**F	OXYGEN WINKLR O2 081**L	TURB NTU 020**L	COLOUR TRUE REL UN 020**L	ODOUR THRESH NO 02001L	NON FILT RES 104**L	FILT RES 104**L	COND US/CM 020**L	ALK TOTAL CaCO3 101**L
WAPITI R AT HWY40BR-C	00AL07GE2015	27	2	90		0	8 2	371	11.5	12	2 2	10	1	9	220	385	178
WAPITI R AT HWY40BR-C	00AL07GE2015	27	2	90						12	1 6	10	1	9	220	381	179
WAPITI R AT HWY40BR-C	00AL07GE2015	27	2	90						12 04	1 6	10	1	13	220	385	177
WAPITI R AT HWY40BR-C	00AL07GE2015	27	2	90	13												
WAPT R 5KD GR P STP-R	00AL07GE2250	27	2	90		-0 1	8 2	384	11 5	11 94		10		6			
WAPT R 5KD GR P STP-R	00AL07GE2250	27	2	90						11 92							
WAPT R D P&G HAULRD-C	00AL07GE2300	27	2	90		-0 3	8 3	385	11 6	11 91	2 2	10	1	14	220	396	180
WAPT R D P&G HAULRD-C	00AL07GE2300	27	2	90						11 9							
WAPT R 1KU P&G EFL-LC	00AL07GE2350	27	2	90		0	8 3	385	11 6	11 9		10	1	13			
WAPT R 1KU P&G EFL-LC	00AL07GE2350	27	2	90						11 93							
BIG MTN CK NR MOUTH	00AL07GE2400	27	2	90	0 172	0	8 6	610	13	12 9	200	100	2	342	400	615	314
BIG MTN CK NR MOUTH	00AL07GE2400	27	2	90						12 93							
WAPITI R AT R R BR-L	00AL07GE3050	28	2	90		0 6	8 1	589	11 6	11 52							
WAPITI R AT R R BR-L	00AL07GE3050	28	2	90						11 67							
WAPITI R AT R R BR-LR	00AL07GE3060	28	2	90							6 4	200	4	14	330	591	181
WAPITI R AT R R BR-R	00AL07GE3065	28	2	90		0 8	8 3	547	11 4	11 75							
WAPITI R AT R R BR-R	00AL07GE3065	28	2	90						11 67							
WAPT R10KD P&G EFL-RC	00AL07GE3500	28	2	90		0	8 2	565	11 9	11 96							
WAPT R10KD P&G EFL-RC	00AL07GE3500	28	2	90						11 86							
WAPT R 1KU BEAR R-C	00AL07GE4050	28	2	90		0 1	8 2	569	10 7	10 83	6 8	160		8	330	591	183
WAPT R 1KU BEAR R-C	00AL07GE4050	28	2	90						10 85							
WAPT R 1KU BEAR R-C	00AL07GE4050	28	2	90						10 77							
WAPT R 6K U MOUTH-C	00AL07GE5000	28	2	90		-0 1	8 1	567				150		6			
WAPT R 6K U MOUTH-C	00AL07GE5000	28	2	90						10 2							
WAPT R U SMOKY R -C	00AL07GJ1000	1	3	90		-0 2	8 2	568	10 1	9 89	5	120	64	10	330	588	184
WAPT R U SMOKY R -C	00AL07GJ1000	1	3	90						9 79							
WAPT R U SMOKY R -C	00AL07GJ1000	1	3	90						9 74							
SMKY R U WAPT R-CMPS1	00AL07GF1000	1	3	90	24 7												
SMOKY R U WAPITI R-R	00AL07GF1015	1	3	90		-0 1	8	449	12 3	11 9	2	10	4	4	265	469	164
SMOKY R U WAPITI R-R	00AL07GF1015	1	3	90						11 89							
SMOKY R U WAPITI R-R	00AL07GF1015	1	3	90						11 86							
SIMONETTE R NR MOUTH	00AL07GF3500	1	3	90		-0 2	7 8	570	10 2	10 51	12	30	1	L 4000	340	585	297
SIMONETTE R NR MOUTH	00AL07GF3500	1	3	90						11 04							
SIMONETTE R NR MOUTH	00AL07GF3500	2	3	90	3 16												
SMKY R BEZANSON BR-C	00AL07GJ2020	6	3	90		-0 1	8 2	468	11 1	10 98	12	50	1	21	268	482	176
SMKY R BEZANSON BR-C	00AL07GJ2020	6	3	90						11 06							
SMKY R BEZANSON BR-C	00AL07GJ2020	6	3	90						10 99							
SMKYR 1KU PUSKWAU R-C	00AL07GJ2030	6	3	90		-0 1	8 1	487	10 5	10 39	4 4	50		8	279	500	177
SMKYR 1KU PUSKWAU R-C	00AL07GJ2030	6	3	90						10 38							
SMKYR 1KU PUSKWAU R-C	00AL07GJ2030	6	3	90						10 32							
PUSKWASKAU R NR MTH-C	00AL07GJ2032	6	3	90		-0 1	7 9	397	12 9	12 52	23	80		27	232	412	174
PUSKWASKAU R NR MTH-C	00AL07GJ2032	6	3	90						12 74							
PUSKWASKAU R NR MTH-C	00AL07GJ2032	7	3	90	0 341												
BAD HEART R NR MTH-C	00AL07GJ2034	6	3	90		-0 1	8 1	218	13 3	13	146	100		48	139	230	73 4
BAD HEART R NR MTH-C	00AL07GJ2034	6	3	90						12 73							
BAD HEART R NR MTH-C	00AL07GJ2034	7	3	90	2 19												
SMKY R 25KU LSMKYR-C	00AL07GJ2050	7	3	90		0	8	473	10 3	10 25		60		13			
SMKY R 25KU LSMKYR-C	00AL07GJ2050	7	3	90						10 26							
SMKY R 25KU LSMKYR-C	00AL07GJ2050	7	3	90						10 29							
L SMOKY R NR MOUTH	00AL07GH1500	6	3	90	15												
L SMOKY R NR MOUTH	00AL07GH1500	7	3	90		-0 1	7 8	286	10 3	10 23	60	60	2	25	160	300	131
L SMOKY R NR MOUTH	00AL07GH1500	7	3	90						10 22							
L SMOKY R NR MOUTH	00AL07GH1500	7	3	90						10 21							
SMOKY R AT WATINO-C	00AL07GJ2060	7	3	90		-0 2	7 9	446	9 9	9 87	13	50	8	10	250	457	149
SMOKY R AT WATINO-C	00AL07GJ2060	7	3	90						9 93							
SMOKY R AT WATINO-C	00AL07GJ2060	7	3	90						9 85							
SMOKY R AT WATINO-C	00AL07GJ2060	8	3	90	81												
SMOKY R SITE S6C-C	00AL07GJ4000	7	3	90		0	8	453	9 7	9 74							
SMOKY R SITE S6C-C	00AL07GJ4000	7	3	90						9 74							
SMOKY R SITE S6C-C	00AL07GJ4000	7	3	90						9 82							
SMOKY R NR MOUTH-C	00AL07GJ5000	7	3	90		-0 2	7 9	465	9 3	9 39	8	50	2	6	260	475	152
SMOKY R NR MOUTH-C	00AL07GJ5000	7	3	90						9 43							
SMOKY R NR MOUTH-C	00AL07GJ5000	7	3	90						9 43							
GR PRAIR SEW EFFL GRB	21AL07GE1000	27	2	90	0.23	4 5	7 8	1088	1 3		1 4	40	8	10	620	1003	233
GR PRAIR SEW EFFL GRB	21AL07GE1000	27	2	90								40	2	7			
P&G SECPND LAG EFFGRB	20AL07GE8000	27	2	90		22	7 1	4620	0 1								

STATION	CODE	D	M	Y	DISCHG M3/S 971**F	TEMP DEG.C 020**F	PH 103**F	COND US/CM 020**F	OXYGEN METER O2 081**F	OXYGEN WINKLR O2 081**L	TURB NTU 020**L	COLOUR TRUE REL UN 020**L	ODOUR THRESH NO 02001L	NON FILT RES 104**L	FILT RES 104**L	COND US/CM 020**L	ALK TOTAL CaCO3 101**L
P&G SECPND LAG EFFGRB	20AL07GE8000	27	2	90		22.1	6.9	4640	0.6								
P&G SECPND LAG EFFGRB	20AL07GE8000	27	2	90		21.8	6.9	4630	0.2								
P&G SECPND LAG EFFGRB	20AL07GE8000	27	2	90		21	7.1										
P&G SECPND LAG EFFGRB	20AL07GE8000	27	2	90		21	7.2										
P&G SECPND LAG EFFGRB	20AL07GE8000	28	2	90		21	7.2										
P&G SECPND LAG EFFGRB	20AL07GE8000	28	2	90		21	7.2										
P&G SECPND LAG EFFGRB	20AL07GE8000	28	2	90		21	7.2										
P&G SECPND LAG EFFCMP	20AL07GE8001	27	2	90	0.516									84	2900	4480	200
P&G SECPND LAG EFFCMP	20AL07GE8001	27	2	90							47	1500	20000				
P&G SECPND LAG EFFCMP	20AL07GE8001	27	2	90								1600					
P&G STORMSEW EFF GRAB	20AL07GE8003	27	2	90		46.8	7.9	280	5.1								
P&G STORMSEW EFF GRAB	20AL07GE8003	28	2	90		48	8.3				20	20	1	20	130	208	67.7
P&G STORMSEW EFF GRAB	20AL07GE8003	28	2	90	0.048												
P&G FOAM PND EFF GRAB	20AL07GE8005	28	2	90		17.8	7.3	4660	5.3		48	1200	64	138	2890	4490	196

STATION	CODE	D	M	Y	HARDNS TOTAL CaCO3 106**L	PH 103**L	Na DISS 111**L	K DISS 19101L	Ca DISS 201**L	Mg DISS 121**L	HCO3 LAB CALCD 062**L	CO3 LAB CALCD 063**L	Cl DISS 172**L	SO4 DISS 163**L	F DISS 091**L	SILICA REACT SIO2 141**L	CN 066**L	S- DISS 161**L
WAPITI R AT HWY40BR-C	00AL07GE2015	27	2	90	194.07	7.85	7.5	0.67	55.4	13.5	216.98	L 5000	1.1	32.2	0.12	3.72	0.001	L 0.01
WAPITI R AT HWY40BR-C	00AL07GE2015	27	2	90	194.39	7.88	7.5	0.67	55.2	13.7	218.2	L 5000	1	32.3	0.11	3.72	0.001	L 0.100
WAPITI R AT HWY40BR-C	00AL07GE2015	27	2	90	195.57	7.87	7.5	0.67	56	13.5	215.76	L 5000	1	32.2	0.1	3.72	0.001	L 0.100
WAPT R 5KD GR P STP-R	00AL07GE2250	27	2	90														
WAPT R D P&G HAULRD-C	00AL07GE2300	27	2	90	187.39	7.93	9.1	0.87	52.4	13.7	219.42	L 5000	2.9	33.2	0.13	3.85		L 0.100
WAPT R 1KU P&G EFL-LC	00AL07GE2350	27	2	90														L 0.100
BIG MTN CK NR MOUTH	00AL07GE2400	27	2	90	274.38	8.17	47.8	3.58	76	20.5	382.77	L 5000	2.7	55	0.14	9.75	0.001	L 0.100
WAPITI R AT R R BR-L	00AL07GE3050	28	2	90														
WAPITI R AT R R BR-LR	00AL07GE3060	28	2	90	206.85	7.77	39.8	1.49	61.5	12.9	220.64	L 5000	39	65.5	0.13	3.96	L 0.010	0.07
WAPITI R AT R R BR-R	00AL07GE3065	28	2	90														
WAPT R10KD P&G EFL-RC	00AL07GE3500	28	2	90														
WAPT R 1KU BEAR R-C	00AL07GE4050	28	2	90	203.08	7.81	40.2	1.49	59.5	13.2	223.08	L 5000	39	64		3.96	L 0.010	0.08
WAPT R 6K U MOUTH-C	00AL07GE5000	28	2	90														
WAPT R U SMOKY R -C	00AL07GJ1000	1	3	90	197.4	8.09	39.8	1.55	56.9	13.4	224.3	L 5000	38.5	67	0.14	3.9	L 0.010	0.057
SMOKY R U WAPITI R-R	00AL07GF1015	1	3	90	215.09	8.06	7.3	0.68	56.4	18	199.92	L 5000	0.8	82.5	0.16	4.1	L 0.010	L 0.100
SIMONETTE R NR MOUTH	00AL07GF3500	1	3	90	251.3	8.07	26.3	1.96	75	15.5	362.04	L 5000	0.6	36.8	0.14	8.7	L 0.010	L 0.100
SMKY R BEZANSON BR-C	00AL07GJ2020	6	3	90	191.47	7.6	18.7	1.89	51.4	15.3	214.54	L 5000	11.7	61.5	0.14	4.4	L 0.010	L 0.100
SMKYR 1KU PUSKWAU R-C	00AL07GJ2030	6	3	90	193.72	7.73	20.9	1.44	52.3	15.3	215.76	L 5000	14	66.5	0.14	4.4		
PUSKWASKAU R NR MTH-C	00AL07GJ2032	6	3	90	172.96	7.54	14.5	5.64	46.3	13.9	212.11	L 5000	5.1	40.2	0.14	11		
BAD HEART R NR MTH-C	00AL07GJ2034	6	3	90	66.739	6.87	17.5	10.8	15.5	6.8	89.475	L 5000	10.4	32	0.14	6.1		
SMKY R 25KU LSMKYR-C	00AL07GJ2050	7	3	90														
L SMOKY R NR MOUTH	00AL07GH1500	7	3	90	111.15	7.37	13.2	5.64	30.3	8.6	159.69	L 5000	6	19.7	0.11	7.55	L 0.010	L 0.100
SMOKY R AT WATINO-C	00AL07GJ2060	7	3	90	170.8	7.76	19.1	2.4	45.6	13.8	181.63	L 5000	12.6	64	0.13	5	L 0.010	0.005
SMOKY R SITE S6C-C	00AL07GJ4000	7	3	90														
SMOKY R NR MOUTH-C	00AL07GJ5000	7	3	90	178.26	7.9	19.4	2.35	47.1	14.7	185.29	L 5000	12.1	66.5	0.16	5	L 0.010	L 0.100
GR PRAIR SEW EFFL GRB	21AL07GE1000	27	2	90	262.26	7.75	116	11.9	70	21.2	284.03	L 5000	125	119	1	9.45	0.002	0.006
GR PRAIR SEW EFFL GRB	21AL07GE1000	27	2	90													0.002	L 0.100
P&G SECPND LAG EFFGRB	20AL07GE8000	27	2	90														
P&G SECPND LAG EFFGRB	20AL07GE8000	27	2	90														
P&G SECPND LAG EFFGRB	20AL07GE8000	27	2	90														
P&G SECPND LAG EFFGRB	20AL07GE8000	27	2	90														
P&G SECPND LAG EFFGRB	20AL07GE8000	27	2	90														
P&G SECPND LAG EFFGRB	20AL07GE8000	28	2	90														
P&G SECPND LAG EFFGRB	20AL07GE8000	28	2	90														
P&G SECPND LAG EFFGRB	20AL07GE8000	28	2	90														
P&G SECPND LAG EFFCMP	20AL07GE8001	27	2	90	732.5	7.58	735	15.5	266	16.4	243.8	L 5000	945	795	0.17	10	0.006	1.477
P&G STORMSEW EFF GRAB	20AL07GE8003	27	2	90														
P&G STORMSEW EFF GRAB	20AL07GE8003	28	2	90	79.855	7.38	14.9	1.1	19.1	7.8	82.526	L 5000	5.2	43.7	0.14	3.7		L 0.100
P&G FOAM PND EFF GRAB	20AL07GE8005	28	2	90	724.56	7.5	735	15.2	262	16.9	238.92	L 5000	965	775	0.17	10.4	0.006	0.66

STATION	CODE	D	M	Y	Li TOTAL 030**L	Be TOTAL 040**L	B TOTAL 050**L	Al TOTAL 130**L	V TOTAL 230**L	Cr TOTAL 240**L	Mn TOTAL 250**L	Fe TOTAL 260**L	Co TOTAL 270**L	Ni TOTAL 280**L	Cu TOTAL 290**L	Zn TOTAL 300**L	As TOTAL 330**L	Se TOTAL 340**L	Sr TOTAL 38001L
WAPITI R AT HWY40BR-C	00AL07GE2015	27	2	90	0.02	0.001	0.01	0.08	0.004	0.009	0.007	0.09	L 0.0010	L 0.0010	0.002	0.002	L 0.0002	0.0003	0.25
WAPITI R AT HWY40BR-C	00AL07GE2015	27	2	90	0.02	L.0010	L 0100	0.08	0.002	0.008	0.007	0.1	L 0.0010	L 0.0010	L 0.0010	0.002	L 0.0002	L 0.0002	0.25
WAPITI R AT HWY40BR-C	00AL07GE2015	27	2	90	0.02	L.0010	L 0100	0.08	0.002	0.008	0.007	0.1	L 0.0010	L 0.0010	0.001	0.002	0.0002	L 0.0002	0.25
WAPT R 5KD GR P STP-R	00AL07GE2250	27	2	90				0.1			0.01	0.17			0.004	0.004			
WAPT R D P&G HAULRD-C	00AL07GE2300	27	2	90	0.02	L.0010	L.0100	0.11	0.005	0.009	0.011	0.17	L 0.0010	L 0.0010	0.002	0.005	0.0004	L 0.0002	0.25
BIG MTN CK NR MOUTH	00AL07GE2400	27	2	90	0.04	0.001	0.07	3.6	0.016	0.017	0.13	9.4	0.005	0.018	0.016	0.015	0.0057	0.0006	0.49
WAPITI R AT R R BR-LR	00AL07GE3060	28	2	90			0.171	0.21			0.046	0.21			0.002	0.008			
WAPT R 1KU BEAR R-C	00AL07GE4050	28	2	90	0.02	L 0.0010	0.01	0.24	L 0.0010	0.021	0.044	0.27	L 0.0010	0.002	0.002	0.009	0.0004	L 0.0002	
WAPT R 6K U MOUTH-C	00AL07GE5000	28	2	90				0.32			0.045	0.4			0.003	0.014			
WAPT R U SMOKY R -C	00AL07GJ1000	1	3	90	0.02	0.001	0.02	0.17	0.005	0.018	0.038	0.23	L 0.0010	0.004	0.001	0.01	0.0004	L 0.0002	0.26
SMOKY R U WAPITI R-R	00AL07GF1015	1	3	90	0.03	L 0.010	L.0100	0.05	L 0.0010	0.004	0.004	0.7	L 0.0010	L 0.0010	L 0.0010	0.003	0.0002	L 0.0002	0.57
SIMONETTE R NR MOUTH	00AL07GF3500	1	3	90	0.04	0.001	0.03	0.13	0.003	0.004	0.12	0.64	L 0.0010	0.002	0.002	0.005	L 0.0002	L 0.0002	0.3
SMKY R BEZANSON BR-C	00AL07GJ2020	6	3	90	0.03	L 0.0010	0.02	0.3	0.004	0.009	0.033	0.51	L 0.0010	0.003	0.002	0.004	0.0004	L 0.0002	0.41
SMKYR 1KU PUSKWAU R-C	00AL07GJ2030	6	3	90				0.11			0.012	0.18			0.003	0.002			
PUSKWASKAU R NR MTH-C	00AL07GJ2032	6	3	90	0.03	0.001	0.04	0.46	0.001	0.006	0.086	2.94	0.001	0.009	0.003	0.005	0.0028	L 0.0002	0.26
BAD HEART R NR MTH-C	00AL07GJ2034	6	3	90	0.03	L 0.010	0.06	5	0.012	0.007	0.16	5.17	0.002	0.018	0.006	0.03	0.0031	L 0.0002	0.107
L SMOKY R NR MOUTH	00AL07GH1500	7	3	90	0.02	L 0.010	0.03	2	0.006	0.035	0.051	2.6	0.001	0.01	0.005	0.014	0.0014	0.0003	0.15
SMOKY R AT WATINO-C	00AL07GJ2060	7	3	90	0.02	0.001	0.02	0.76	0.008	0.038	0.017	0.91	L 0.0010	0.007	0.005	0.014	0.0007	L 0.0002	0.35
SMOKY R NR MOUTH-C	00AL07GJ5000	7	3	90	0.03	L 0.0010	0.01	0.56	0.001	0.032	0.015	0.74	L 0.0010	0.008	0.003	0.005	0.0007	L 0.0002	0.37
GR PRAIR SEW EFFL GRB	21AL07GE1000	27	2	90	0.03	L 0.0010	0.41	0.07	0.005	0.011	0.12	0.12	L 0.0010	0.004	0.007	0.018	0.0009	0.0005	0.28
P&G SECPND LAG EFFCMP	20AL07GE8001	27	2	90	0.07	0.001	0.03	0.99	0.008	0.37	0.82	0.58	L 0.0010	0.003	0.005	0.12	0.0004	L 0.0002	0.36
P&G STORMSEW EFF GRAB	20AL07GE8003	28	2	90	0.01	L 0.0010	0.03	1	0.002	0.016	0.035	0.62	L 0.0010	L 0.0010	0.007	0.005	0.0004	L 0.0002	0.094
P&G FOAM PND EFF GRAB	20AL07GE8005	28	2	90	0.07	0.001	0.03	0.74	0.012	0.35	0.78	0.54	L 0.0010	0.004	0.004	0.097	0.0004	L 0.0002	0.37

STATION	CODE	D	M	Y	Mo TOTAL 420**L	Ag TOTAL 470**L	Cd TOTAL 480**L	Sb TOTAL 510**L	Ba TOTAL 560**L	Hg TOTAL UG/L 800**L	Pb TOTAL 820**L
WAPITI R AT HWY40BR-C	00AL07GE2015	27	2	90	0.003	L 0.0010	L 0.0010	L 0.0002	0.12	L 0.0500	L 0.0020
WAPITI R AT HWY40BR-C	00AL07GE2015	27	2	90	L 0.0010	L 0.0010	L 0.0010	L 0.0002	0.12	L 0.0500	L 0.0020
WAPITI R AT HWY40BR-C	00AL07GE2015	27	2	90	0.002	L 0.0010	L 0.0010	L 0.0002	0.12	L 0.0500	L 0.0020
WAPT R 5KD GR P STP-R	00AL07GE2250	27	2	90							0.002
WAPT R D P&G HAULRD-C	00AL07GE2300	27	2	90	0.003	L 0.0010	L 0.0010	L 0.0002	0.12	L 0.0500	L 0.0020
BIG MTN CK NR MOUTH	00AL07GE2400	27	2	90	0.011	L 0.0010	L 0.0010	L 0.0002	0.23	L 0.0500	0.007
WAPITI R AT R R BR-LR	00AL07GE3060	28	2	90							L 0.0020
WAPT R 1KU BEAR R-C	00AL07GE4050	28	2	90	L 0.0010	L 0.0010	L 0.0010	L 0.0002	0.13	L 0.0500	0.004
WAPT R 6K U MOUTH-C	00AL07GE5000	28	2	90							0.004
WAPT R U SMOKY R -C	00AL07GJ1000	1	3	90	0.005	L 0.0010	L 0.0010	L 0.0002	0.14	L 0.0500	0.004
SMOKY R U WAPITI R-R	00AL07GF1015	1	3	90	L 0.0010	L 0.0010	L 0.0010	L 0.0002	0.1	L 0.0500	L 0.0020
SIMONETTE R NR MOUTH	00AL07GF3500	1	3	90	0.005	L 0.0010	L 0.0010	L 0.0002	0.16	L 0.0500	0.004
SMKY R BEZANSON BR-C	00AL07GJ2020	6	3	90	0.008	L 0.0010	L 0.0010	L 0.0002	0.12	L 0.0500	0.002
SMKYR 1KU PUSKWAU R-C	00AL07GJ2030	6	3	90							0.003
PUSKWASKAU R NR MTH-C	00AL07GJ2032	6	3	90	L 0.0010	L 0.0010	L 0.0010	L 0.0002	0.09	L 0.0500	0.002
BAD HEART R NR MTH-C	00AL07GJ2034	6	3	90	0.112	L 0.0010	L 0.0010	L 0.0002	0.1	L 0.0500	0.004
L SMOKY R NR MOUTH	00AL07GH1500	7	3	90	0.008	L 0.0010	L 0.0010	L 0.0002	0.09	L 0.0500	0.002
SMOKY R AT WATINO-C	00AL07GJ2060	7	3	90	0.005	L 0.0010	L 0.0010	L 0.0002	0.11	L 0.0500	0.004
SMOKY R NR MOUTH-C	00AL07GJ5000	7	3	90	L 0.0010	L 0.0010	L 0.0010	L 0.0002	0.12	L 0.0500	0.007
GR PRAIR SEW EFFL GRB	21AL07GE1000	27	2	90	0.003	L 0.0010	L 0.0010	0.0009	0.03	L 0.0500	0.002
P&G SECPND LAG EFFCMP	20AL07GE8001	27	2	90	0.016	L 0.0010	L 0.0010	L 0.0002	0.57	L 0.0500	L 0.0020
P&G STORMSEW EFF GRAB	20AL07GE8003	28	2	90	0.002	L 0.0010	L 0.0010	L 0.0002	0.05	0.12	L 0.0020
P&G FOAM PND EFF GRAB	20AL07GE8005	28	2	90	0.017	L 0.0010	L 0.0010	L 0.0002	0.55	L 0.0500	L 0.0020

STATION	CODE	D	M	Y	N TKN 070**L	N TOTAL NH3 075**L	N TOTAL NH3 NO2 075**L	N DISS NO3N 071**L	N DISS NO2 072**L	P TOTAL 150**L	P TOTAL 154**L	P DISS 151**L	CARBON TOTAL ORG 060**L	CARBON DISS ORG 061**L	BOD 5 DAY 082**L	BOD DISS 5 DAY 082**L	COD TOTAL 083**L	PHENOL 065**L	TANNIN AND LIGNIN 065**L
WAPITI R AT HWY40BR-C	00AL07GE2015	27	2	90	0.16	0.01	0.01	0.085			0.0057	0.0023	2.5	2.5	0.05	0.12	20.2	L.001	0.4
WAPITI R AT HWY40BR-C	00AL07GE2015	27	2	90	0.14	0.01		0.085			0.0052	0.0025	2.5	2.5	0.1		10.1	L.0010	0.4
WAPITI R AT HWY40BR-C	00AL07GE2015	27	2	90	0.1	0.01		0.084			0.0052	0.0023	2.6	2.6	0.04		10.1	L.0010	0.35
WAPT R 5KD GR P STP-R	00AL07GE2250	27	2	90	0.26	0.12		0.183			0.0757	0.0693	2.8	2.7	0.14			L.0010	0.34
WAPT R 5KD GR P STP-R	00AL07GE2250	27	2	90		0.11									0.18				
WAPT R D P&G HAULRD-C	00AL07GE2300	27	2	90	0.26	0.11		0.183			0.0719	0.0648	2.7	2.7	0.1	0.1	L5.000		0.36
WAPT R D P&G HAULRD-C	00AL07GE2300	27	2	90		0.11									0.07				
WAPT R 1KU P&G EFL-LC	00AL07GE2350	27	2	90	0.26	0.11		0.181			0.07	0.0624	2.4	2.4	0.15	0.08	L5.000	L.0010	0.37
WAPT R 1KU P&G EFL-LC	00AL07GE2350	27	2	90		0.11									0.08				
BIG MTN CK NR MOUTH	00AL07GE2400	27	2	90	1.16	0.1		0.135			0.2416	0.0258	28.7	26.8	0.55		90.7	0.005	2.8
BIG MTN CK NR MOUTH	00AL07GE2400	27	2	90		0.1									0.59				
WAPITI R AT R R BR-LR	00AL07GE3060	28	2	90	0.78	0.14				0.128			12.8	12.1	1.6		45	0.022	5.3
WAPITI R AT R R BR-LR	00AL07GE3060	28	2	90		0.12													
WAPITI R AT R R BR-LR	00AL07GE3060	28	2	90		0.14													
WAPITI R AT R R BR-R	00AL07GE3065	28	2	90							0.1335	0.0797							
WAPT R10KD P&G EFL-RC	00AL07GE3500	28	2	90		0.11									1.2				
WAPT R10KD P&G EFL-RC	00AL07GE3500	28	2	90		0.13													
WAPT R10KD P&G EFL-RC	00AL07GE3500	28	2	90		0.12													
WAPT R 1KU BEAR R-C	00AL07GE4050	28	2	90	0.68	0.15		0.168		0.128	0.1311	0.0846	12.5	12	0.9		39.2	0.023	5.1
WAPT R 1KU BEAR R-C	00AL07GE4050	28	2	90		0.16													
WAPT R 1KU BEAR R-C	00AL07GE4050	28	2	90		0.17													
WAPT R 6K U MOUTH-C	00AL07GE5000	28	2	90		0.16		0.164			0.1267	0.079	0.7	12	0.7			0.022	
WAPT R 6K U MOUTH-C	00AL07GE5000	28	2	90		0.17													
WAPT R U SMOKY R -C	00AL07GJ1000	1	3	90	0.64	0.16	0.168	0.163	0.009		0.1218	0.0797	11.8	11.4	2.9	2.7	39.2	0.03	5
WAPT R U SMOKY R -C	00AL07GJ1000	1	3	90		0.16									2.8				
WAPT R U SMOKY R -C	00AL07GJ1000	1	3	90		0.16									2.9				
SMOKY R U WAPITI R-R	00AL07GF1015	1	3	90	0.1	0.01		0.074			0.004	0.0017	1.6	1.6	0.18	0.18	9.8	L.0010	0.6
SMOKY R U WAPITI R-R	00AL07GF1015	1	3	90		0.01									0.12				
SMOKY R U WAPITI R-R	00AL07GF1015	1	3	90		L.0100									0.08				
SIMONETTE R NR MOUTH	00AL07GF3500	1	3	90	0.4	0.06		0.14			0.0227	0.0065	8.9	8.6	0.3		9.8	L.0010	0.9
SIMONETTE R NR MOUTH	00AL07GF3500	1	3	90		0.05									0.08				
SMKY R BEZANSON BR-C	00AL07GJ2020	6	3	90	1.36	0.08		0.14			0.0683	0.0387	6.4	6.2	1.3		23	0.006	2
SMKY R BEZANSON BR-C	00AL07GJ2020	6	3	90		0.08									1.3				
SMKY R BEZANSON BR-C	00AL07GJ2020	6	3	90		0.07									1.4				
SMKYR 1KU PUSKWAU R-C	00AL07GJ2030	6	3	90	0.36	0.07		0.13			0.045	0.0348	6	6	1	0.7		0.006	2.05
SMKYR 1KU PUSKWAU R-C	00AL07GJ2030	6	3	90		0.08									0.99				
SMKYR 1KU PUSKWAU R-C	00AL07GJ2030	6	3	90		0.06									0.66				
PUSKWASKAU R NR MTH-C	00AL07GJ2032	6	3	90	1.76	0.1		0.375			0.1747	0.0988	33	32.4	1.45			0.012	2.8
PUSKWASKAU R NR MTH-C	00AL07GJ2032	6	3	90		0.1									1.16				
BAD HEART R NR MTH-C	00AL07GJ2034	6	3	90	2.56	0.25		1.18			0.5441	0.24	23.8	23.5	4.5			0.025	4.7
BAD HEART R NR MTH-C	00AL07GJ2034	6	3	90		0.27									6.7				
SMKY R 25KU LSMKYR-C	00AL07GJ2050	7	3	90	0.44	0.07		0.196			0.0636	0.0435	7.1	6.8	2.3			0.003	2.3
SMKY R 25KU LSMKYR-C	00AL07GJ2050	7	3	90		0.06									1.47				
SMKY R 25KU LSMKYR-C	00AL07GJ2050	7	3	90		0.07									1.56				
L SMOKY R NR MOUTH	00AL07GH1500	7	3	90	1.52	0.08		0.71			0.1911	0.0907	15.2	14.9	4.51		40	0.005	2
L SMOKY R NR MOUTH	00AL07GH1500	7	3	90		0.07									1.7				
L SMOKY R NR MOUTH	00AL07GH1500	7	3	90		0.06									1.6				
SMOKY R AT WATINO-C	00AL07GJ2060	7	3	90	0.64	0.07	0.043	0.29			0.0788	0.044	8.9	8.3	2.02	1.95	19.6	0.011	2.05
SMOKY R AT WATINO-C	00AL07GJ2060	7	3	90		0.05									2.25				
SMOKY R AT WATINO-C	00AL07GJ2060	7	3	90		0.05									2.3				
SMOKY R SITE S6C-C	00AL07GJ4000	7	3	90							0.0632	0.0347							
SMOKY R NR MOUTH-C	00AL07GJ5000	7	3	90	0.36	0.03		0.272			0.0498	0.0272	8	7.8	1.38	0.66	29.4	0.003	2.05
SMOKY R NR MOUTH-C	00AL07GJ5000	7	3	90		0.03									0.5				
SMOKY R NR MOUTH-C	00AL07GJ5000	7	3	90		0.03													
GR PRAIR SEW EFFL GRB	21AL07GE1000	27	2	90	10	6.2	7.6	5.8		4.5			12.5	12.5	4.4	3.1	50.4	0.011	2.4
GR PRAIR SEW EFFL GRB	21AL07GE1000	27	2	90	10.4	6		5.75		4.65			12.5	12.4	7.6		60.5	0.006	2.4
P&G SECPND LAG EFFCMP	20AL07GE8001	27	2	90	14	0.1		0.07		1.4			258	242	39.2		706	0.759	54
P&G SECPND LAG EFFCMP	20AL07GE8001	27	2	90		0.1							262	250	62			0.46	45
P&G SECPND LAG EFFCMP	20AL07GE8001	27	2	90		0.09													
P&G STORMSEW EFF GRAB	20AL07GE8003	28	2	90	0.16	0.01		0.192		0.038			1.7	1.5	0.64		L5.000		0.2
P&G STORMSEW EFF GRAB	20AL07GE8003	28	2	90		L.0100									0.41				
P&G FOAM PND EFF GRAB	20AL07GE8005	28	2	90	10.4	0.1		0.07		1.46							415	0.48	
P&G FOAM PND EFF GRAB	20AL07GE8005	28	2	90		0.09													

STATION	CODE	D	M	Y	COLI TOTAL NO/DL 360**L	COLI FECAL NO/DL 360**L	CHLORO PHYLLa MG/M3 067**L
WAPITI R AT HWY40BR-C	00AL07GE2015	27	2	90	196	L4.	L0.1
WAPITI R AT HWY40BR-C	00AL07GE2015	27	2	90	184	L4.	
WAPITI R AT HWY40BR-C	00AL07GE2015	27	2	90	212	4	
WAPT R 5KD GR P STP-R	00AL07GE2250	27	2	90	2100	124	
WAPT R D P&G HAULRD-C	00AL07GE2300	27	2	90	1900	80	0.1
WAPT R 1KU P&G EFL-LC	00AL07GE2350	27	2	90	1800	64	
WAPITI R AT R R BR-R	00AL07GE3065	28	2	90	1400	88	0.3
WAPT R .1KU BEAR R-C	00AL07GE4050	28	2	90		12	0.3
WAPT R U SMOKY R -C	00AL07GJ1000	1	3	90	450	16	0.3
SMOKY R U WAPITI R-R	00AL07GF1015	1	3	90	24	L4.	0.1
SIMONETTE R NR MOUTH	00AL07GF3500	1	3	90	84	28	
SMKY R BEZANSON BR-C	00AL07GJ2020	6	3	90	2900	36	0.2
SMKYR 1KU PUSKWAU R-C	00AL07GJ2030	6	3	90	310	4	
PUSKWASKAU R NR MTH-C	00AL07GJ2032	6	3	90	250	4	
BAD HEART R NR MTH-C	00AL07GJ2034	6	3	90	3900	L10	
SMKY R 25KU LSMKYR-C	00AL07GJ2050	7	3	90	84	L4	
L SMOKY R NR MOUTH	00AL07GH1500	7	3	90	430	3	0.8
SMOKY R AT WATINO-C	00AL07GJ2060	7	3	90	310	L4	0.2
SMOKY R SITE S6C-C	00AL07GJ4000	7	3	90	204	4	
SMOKY R NR MOUTH-C	00AL07GJ5000	7	3	90	156	16	L0.1
GR PRAIR SEW EFFL GRB	21AL07GE1000	27	2	90	65000	2600	3.3
GR PRAIR SEW EFFL GRB	21AL07GE1000	27	2	90	75000	950	
P&G STORMSEW EFF GRAB	20AL07GE8003	28	2	90	L10.	L10	

Results are mg/L unless noted ** - more than one analytical code may be included, k - kilometre, u - upstream of, d - downstream of, L - left, C - centre, R - right, LR - left/right comp , F - field measurement, L - lab analysis

WAPITI - SMOKY RIVER SURVEY - FEBRUARY-MARCH 1991

STATION	CODE	D	M	Y	DISCHG M3/S 071**F	TEMP DEG.C 020**F	PH 103**F	COND US/CM 020**F	OXYGEN METER O2 081**F	OXYGEN WINKLR O2 081**L	NON FILT RES 104**L	COLOUR TRUE REL UN 020**L	ODOUR THRESH NO 02001L	TOTAL RES 104**L	TDS CALCD 002**L	TDS (DIFF) 002**L
WAPITI R AT HWY40BR-C	09AL07GE2015	27	2	91	16	0.02	6	361	12.63	12.28	13	6	1	222	212	209
WAPITI R AT HWY40BR-C	09AL07GE2015	27	2	91						12.18	13	6				
WAPT R D P&G HAULRD-C	09AL07GE2300	27	2	91		-0.02	7.68	370	12.56	12.28	13	7	1	244	214	231
WAPT R D P&G HAULRD-C	09AL07GE2300	27	2	91						12.18						
WAPITI R AT R.R.BR-L	09AL07GE3050	27	2	91		1.02	7.60	479	12.35	12.08						
WAPITI R AT R.R.BR-L	09AL07GE3050	27	2	91						12.18						
WAPITI R AT R.R.BR-LR	09AL07GE3060	27	2	91							14	71	4			
WAPITI R AT R.R.BR-R	09AL07GE3065	27	2	91		0.93	7.67	479	12.43	12.18						
WAPITI R AT R.R.BR-R	09AL07GE3065	27	2	91						12.28						
WAPT R10KD P&G EFL-RC	09AL07GE3500	28	2	91		-0.4	8.2	400	13.4	12.63	14	71	4	352	292	338
WAPT R10KD P&G EFL-RC	09AL07GE3500	28	2	91						12.48						
WAPT R10KD P&G EFL-RC	09AL07GE3500	28	2	91						12.58						
WAPT R 1KU BEAR R-C	09AL07GE4050	28	2	91							15	75	4	346	294	351
BEAR R NR MOUTH-C	09AL07GE4500	28	2	91	0.622									500	350	438
BEAR R NR MOUTH-C	09AL07GE4500	28	2	91							62	40	4			
WAPT R 6K U MOUTH-C	09AL07GE5000	28	2	91							16	68	4			
WAPT R U SMOKY R -C	09AL07GJ1000	28	2	91							16	79	4	346	293	332
SMOKY R U WAPITI R-R	09AL07GF1015	26	2	91	25.7									298	270	294
SMOKY R U WAPITI R-R	09AL07GF1015	1	3	91							4	2	1			
SIMONETTE R NR MOUTH	09AL07GF3500	1	3	91							11	12		360	325	349
SMKY R BEZANSON BR-C	09AL07GJ2020	1	3	91							8	27				
SMKYR 1KU PUSKWAU R-C	09AL07GJ2030	5	3	91							3	36	2	340	296	337
PUSKWASKAU R NR MTH-C	09AL07GJ2032	5	3	91							6	35		818	737	812
PUSKWASKAU R NR MTH-C	09AL07GJ2032	5	3	91	0.003											
SMKY R 25KU LSMKYR-C	09AL07GJ2050	5	3	91							4	35				
L SMOKY R NR MOUTH	09AL07GH1500	5	3	91	3.24											
L SMOKY R NR MOUTH	09AL07GH1500	5	3	91							4	22	1	290	247	286
SMOKY R AT WATINO-C	09AL07GJ2060	6	3	91							2	34	2	322	290	320
SMOKY R AT WATINO-C	09AL07GJ2060	6	3	91	34.1											
SMOKY R NR MOUTH-C	09AL07GJ5000	11	3	91							6	32	2	332	293	326
GR PRAIR SEW EFFL GRB	21AL07GE1000	27	2	91	0.225	4.6	7.5	1010	2		2	50	2	608	665	606
P&G SECPND LAG EFFGRB	29AL07GE8000	27	2	91		21.8	7.5	2970	3.3							
P&G SECPND LAG EFFCMP	29AL07GE8001	26	2	91	0.735						38	2293	200	2560	1952	2541
P&G SECPND LAG EFFCMP	29AL07GE8001	26	2	91							19	2256	100	2600	1970	2581
P&G STORMSEW EFF GRAB	29AL07GE8003	27	2	91	0.016	24.5	8	297	7		76	233	10	264	151	186
P&G FOAM PND EFF GRAB	29AL07GE8005	27	2	91		20.2	7.8	2900	7.1							

STATION	CODE	D	M	Y	COND US/CM 020**L	ALK TOTAL CaCO3 101**L	HARDNS TOTAL CaCO3 105**L	PH 103**L	Na DISS 111**L	K DISS 19101L	Ca DISS 201**L	Mg DISS 121**L	HCO3 LAB CALCD 062**L	CO3 LAB CALCD 063**L	Cl DISS 172**L	SO4 DISS 163**L	F DISS 081**L	SILICA REACT SIO2 141**L	S- DISS 161**L
WAPITI R AT HWY40BR-C	09AL07GE2015	27	2	91	364	168	186	8.01	7	0.6	53	13	206			36	0.1	3.3	L.001
WAPITI R AT HWY40BR-C	09AL07GE2015	27	2	91															
WAPT R D P&G HAULRD-C	09AL07GE2300	27	2	91	393	170	184	7.99	8	0.7	54	12	207			35	0.1	3.4	L.001
WAPITI R AT R.R.BR-L	09AL07GE3050	27	2	91															
WAPITI R AT R.R.BR-LR	09AL07GE3060	27	2	91															0.035
WAPITI R AT R.R.BR-R	09AL07GE3065	27	2	91															
WAPT R10KD P&G EFL-RC	09AL07GE3500	28	2	91	517	180	203	7.74	32	1.2	60	13	219			51	0.12	3.6	0.025
WAPT R 1KU BEAR R-C	09AL07GE4050	28	2	91	519	181	206	7.73	32	1.2	61	13	221			52	0.12	3.6	0.024
BEAR R NR MOUTH-C	09AL07GE4500	28	2	91	644	190	179	7.54	65	9.4	47	15	232			51	0.22	8	L.001
WAPT R 6K U MOUTH-C	09AL07GE5000	28	2	91															0.021
WAPT R U SMOKY R -C	09AL07GJ1000	28	2	91	511	177	207	7.76	27	8.2	60	14	216			51	0.12	20.1	0.023
SMOKY R U WAPITI R-R	09AL07GF1015	1	3	91	465	165	232	7.86	8	0.6	65	17	201			79	0.13	3.7	L.001
SIMONETTE R NR MOUTH	09AL07GF3500	1	3	91	564	276	271	7.77	26	1.5	82	16	336			33	0.12	7.6	
SMKY R BEZANSON BR-C	09AL07GJ2020	1	3	91															
SMKYR 1KU PUSKWAU R-C	09AL07GJ2030	5	3	91	512	185	235	7.98	18	1.1	66	17	226			71	0.11	4.2	0.008
PUSKWASKAU R NR MTH-C	09AL07GJ2032	5	3	91	1170	517	484	8.05	86	5.1	128	40	630			155	0.21	10.5	
SMKY R 25KU LSMKYR-C	09AL07GJ2050	5	3	91															
L SMOKY R NR MOUTH	09AL07GH1500	5	3	91	449	226	198	7.65	21	1.4	58	13	276			15	0.1	8.3	L.001
SMOKY R AT WATINO-C	09AL07GJ2060	6	3	91	507	187	235	7.9	18	1.1	66	17	228			65	0.12	4.4	0.005
SMOKY R NR MOUTH-C	09AL07GJ5000	11	3	91	515	195	231	8	18	1.2	63	18	238			63	0.11	4.9	0.004
GR PRAIR SEW EFFL GRB	21AL07GE1000	27	2	91	1081	170	236	7.45	114	11.5	63	19	207			102	1	8.9	0.008
P&G SECPND LAG EFFGRB	29AL07GE8000	27	2	91															
P&G SECPND LAG EFFCMP	29AL07GE8001	26	2	91	3190	318	443	7.34	550	11.1	156	13	388			417	0.14	8.8	0.44
P&G SECPND LAG EFFCMP	29AL07GE8001	26	2	91	3190	319	441	7.34	560	11.2	155	13	389			422	0.14	8.8	0.487
P&G STORMSEW EFF GRAB	29AL07GE8003	27	2	91	264	70	86	7.19	15	1.2	27	7	65			49	0.09	3	0.003
P&G FOAM PND EFF GRAB	29AL07GE8005	27	2	91															

STATION	CODE	D	M	Y	Be DISS 041**L	Al EXT 13030L	V TOTAL 230**L	Cr TOTAL 240**L	Mn TOTAL 250**L	Fe TOTAL 260**L	Co TOTAL 270**L	Ni TOTAL 280**L	Cu TOTAL 290**L	Zn TOTAL 300**L	As TOTAL 330**L	Se TOTAL 340**L	Mo TOTAL 420**L	Cd TOTAL 480**L	Sb TOTAL 560**L	Hg TOTAL 600**L	Pb EXT 623**L
WAPITI R AT HWY40BR-C	00AL07GE2015	27	2	91	L.001	0.046	L.002	L.001	0.014	0.334	L.001	0.001	L.001	0.002	0.0003	L.0001	L.001	0.001	0.114	L.0001	L.002
WAPT R D P&G HAULRD-C	00AL07GE2300	27	2	91	L.001		0.002	0.002	0.018	0.327	L.001	0.005	0.002	0.003			L.001	0.002	0.113		
WAPITI R AT R R BR-LR	00AL07GE3060	27	2	91	L.001	0.123	0.003	0.003	0.067	0.341	L.001	0.004	0.003	0.019	0.0003	L.0001	L.001	0.002	0.126	L.0001	L.002
WAPT R10KD P&G EFL-RC	00AL07GE3500	28	2	91	L.001		0.003	0.003	0.069	0.381	0.002	0.003	0.002	0.005			0.007	0.003	0.125		
WAPT R 1KU BEAR R-C	00AL07GE4050	28	2	91	L.001	0.156	0.003	0.004	0.063	0.41	L.001	0.004	0.003	0.006	0.0003	0.0001	L.001	0.003	0.126	L.0001	0.002
BEAR R NR MOUTH-C	00AL07GE4500	28	2	91	L.001	0.364	0.007	0.006	0.116	2.347	0.002	0.01	0.007	0.023	0.0015	0.0003	L.001	0.003	0.119	L.0001	
WAPT R 6K U MOUTH-C	00AL07GE5000	28	2	91	L.001		0.004	0.004	0.08	0.424	0.002	0.004	0.003	0.017			L.001	0.004	0.126		
WAPT R U SMOKY R -C	00AL07GJ1000	28	2	91	L.001	0.139	0.002	0.002	0.065	0.427	L.001	0.003	0.002	0.005	0.0004	L.0001	0.002	0.005	0.122	L.0001	L.002
SMOKY R U WAPITI R-R	00AL07GF1015	1	3	91	L.001	0.016	L.002	0.001	0.005	0.068	L.001	0.003	0.002	L.001	0.0002	L.0001	L.001	L.001	0.082	L.0001	L.002
SIMONETTE R NR MOUTH	00AL07GF3600	1	3	91	L.001	0.035	L.002	L.001	0.07	0.456	L.001	0.003	0.002	0.004	0.0003	L.0001	L.001	0.003	0.136	0.0001	L.002
SMKY R BEZANSON BR-C	00AL07GJ2020	1	3	91	L.001		L.002	L.001	0.031	0.247	L.001	0.004	L.001	0.002			L.001	0.002	0.109		
SMKYR 1KU PUSKWAU R-C	00AL07GJ2030	5	3	91	L.001	0.05	0.002	0.002	0.024	0.208	L.001	0.003	0.003	0.005	0.0002	0.0001	L.001	L.001	0.12	L.0001	0.005
PUSKWASKAU R NR MTH-C	00AL07GJ2032	5	3	91	L.001		0.005	0.004	0.218	0.755	0.003	0.009	0.005	0.003			0.005	0.003	0.165	L.0001	
SMKY R 25KU LSMKYR-C	00AL07GJ2050	5	3	91	L.001		0.002	0.002	0.015	0.214	0.001	0.003	0.002	0.003			0.002	0.001	0.12		
L SMOKY R NR MOUTH	00AL07GH1500	5	3	91	L.001	0.03	L.002	0.005	0.016	0.511	L.001	0.003	0.002	0.001	0.0008	L.0001	0.001	L.001	0.129	L.0001	L.002
SMOKY R AT WATINO-C	00AL07GJ2060	6	3	91	L.001	0.044	0.003	0.003	0.015	0.214	0.001	0.003	0.002	0.003	0.0003	L.0001	L.001	L.001	0.117	L.0001	L.002
SMOKY R NR MOUTH-C	00AL07GJ5000	11	3	91	L.001		0.002	0.002	0.019	0.297	L.001	0.002	0.003	0.003			L.001	L.001	0.123		
GR PRAIR SEW EFFL GRB	21AL07GE1000	27	2	91	L.001	0.016	L.002	0.001	0.08	0.093	L.001	0.004	0.006	0.023	0.0008	0.0003	0.003	0.003	0.042	L.0001	0.003
P&G SECPND LAG EFFCMP	20AL07GE8001	26	2	91	L.001	0.613	0.003	0.007	0.451	0.26	0.001	0.003	0.004	0.043	0.0004	0.0001	0.002	0.003	0.186	L.0001	0.004
P&G SECPND LAG EFFCMP	20AL07GE8001	26	2	91	L.001		0.002	0.008	0.632	0.331	L.001	L.001	0.004	0.057			L.001	0.001	0.236		
P&G STORMSEW EFF GRAB	20AL07GE8003	27	2	91	L.001	0.568	L.002	L.001	0.082	2.105	L.001	L.001	L.001	0.021	0.001	0.0001	L.001	L.001	0.079	L.0001	L.002

STATION	CODE	D	M	Y	N PARTIC 079**L	N TKN 070**L	N TOTAL NH3 075**L	N DISS NO2 NO3 071**L	N DISS NO2NO3 071**L	N DISS NO2 072**L	P TOTAL 154**L	P DISS 151**L	CARBON PARTIC TOTAL 069**L	CARBON DISS ORG 061**L	BOD 5 DAY 082**L	COD TOTAL 083**L	PHENOL 065**L	TANNIN AND LIGNIN 065**L
WAPITI R AT HWY40BR-C	00AL07GE2015	27	2	91	0.03	0.1	0.02		0.06	L.001	0.008	0.003	0.07	2.3	0.5	6	L.001	L.05
WAPITI R AT HWY40BR-C	00AL07GE2015	27	2	91	0.04	0.08	0.02		0.06		0.01	0.002	0.22	2.2	0.4		L.001	L.05
WAPT R D P&G HAULRD-C	00AL07GE2300	27	2	91	0.03	0.2	0.11		0.13	0.003	0.058	0.049	0.26	2.1	0.7	6	L.001	L.05
WAPT R D P&G HAULRD-C	00AL07GE2300	27	2	91			0.12								1.2			
WAPITI R AT R R BR-LR	00AL07GE3060	27	2	91	0.25	0.47	0.12		0.12		0.001	0.044	1.2	11.9	2.6	38	0.018	2.35
WAPITI R AT R R BR-LR	00AL07GE3060	27	2	91			0.11								2.8			
WAPITI R AT R R BR-LR	00AL07GE3060	27	2	91			0.13								2			
WAPT R10KD P&G EFL-RC	00AL07GE3500	28	2	91	0.21	0.47	0.13		0.12	0.004	0.086	0.039	1.22	12.3	2.2	38	0.019	2.45
WAPT R10KD P&G EFL-RC	00AL07GE3500	28	2	91			0.13								2.3			
WAPT R10KD P&G EFL-RC	00AL07GE3500	28	2	91			0.13								2			
WAPT R 1KU BEAR R-C	00AL07GE4050	28	2	91	0.22	0.47	0.13		0.122	0.004	0.086	0.038	1.32	12.2	2.1	38	0.019	2.35
WAPT R 1KU BEAR R-C	00AL07GE4050	28	2	91			0.13								2			
WAPT R 1KU BEAR R-C	00AL07GE4050	28	2	91			0.14								1.9			
BEAR R NR MOUTH-C	00AL07GE4500	28	2	91	0.24	1.55	0.07		0.775	0.011	0.143	0.026	3.05	19.6	2		0.007	0.51
WAPT R 6K U MOUTH-C	00AL07GE5000	28	2	91	0.2	0.47	0.13		0.136		0.077	0.034	1.24	12.3	1.6		0.02	2.28
WAPT R 6K U MOUTH-C	00AL07GE5000	28	2	91			0.16								1.6			
WAPT R 6K U MOUTH-C	00AL07GE5000	28	2	91			0.13								1.6			
WAPT R U SMOKY R -C	00AL07GJ1000	28	2	91	0.18	0.47	0.12		0.134	0.007	0.076	0.028	1.18	12.2	1.7	37	0.018	2.21
WAPT R U SMOKY R -C	00AL07GJ1000	28	2	91			0.12								1.5			
WAPT R U SMOKY R -C	00AL07GJ1000	28	2	91			0.12								1.6			
SMOKY R U WAPITI R-R	00AL07GF1015	1	3	91	L.02	0.03	L0.01		0.064	0.001	0.004	0.002	0.13	1.5	0.2	4	L.001	L.05
SMOKY R U WAPITI R-R	00AL07GF1015	1	3	91			L0.01								0.3			
SIMONETTE R NR MOUTH	00AL07GF3600	1	3	91	0.05	0.16	0.02		0.11	0.002	0.009	0.002	0.07	5.3	0.5		0.001	0.16
SMKY R BEZANSON BR-C	00AL07GJ2020	1	3	91	0.08	0.21	0.02		0.095		0.024	0.006	0.23	4.7	1		0.004	0.6
SMKY R BEZANSON BR-C	00AL07GJ2020	1	3	91			0.02								0.9			
SMKYR 1KU PUSKWAU R-C	00AL07GJ2030	5	3	91	0.08	0.26	0.09		0.108	0.003	0.028	0.015	0.31	5.5	0.7	17	0.007	0.62
SMKYR 1KU PUSKWAU R-C	00AL07GJ2030	5	3	91			0.07								0.5			
PUSKWASKAU R NR MTH-C	00AL07GJ2032	5	3	91	0.05	1.15	0.32		1.52	0.009	0.01	0.004	0.07	18.6	0.5		0.004	0.78
SMKY R 25KU LSMKYR-C	00AL07GJ2050	5	3	91	0.05	0.22	0.05		0.112		0.024		0.09	5.8	0.3	18	0.008	0.66
SMKY R 25KU LSMKYR-C	00AL07GJ2050	5	3	91			0.05								0.3			
L SMOKY R NR MOUTH	00AL07GH1500	5	3	91	0.05	0.28	L0.01		0.133	0.002	0.016	0.008	0.18	8.4	0.5		0.003	0.38
SMOKY R AT WATINO-C	00AL07GJ2060	6	3	91	0.03	0.2	0.06		0.11	0.003	0.021	0.011	0.09	5.6	1.1	18	0.008	0.74
SMOKY R AT WATINO-C	00AL07GJ2060	6	3	91			0.05								1			
SMOKY R AT WATINO-C	00AL07GJ2060	6	3	91			0.06								1			
SMOKY R NR MOUTH-C	00AL07GJ5000	11	3	91	0.04	0.25	0.07		0.124	0.003	0.024	0.012	0.11	5.9	0.3		0.006	0.79
SMOKY R NR MOUTH-C	00AL07GJ5000	11	3	91			0.1								0.2			
GR PRAIR SEW EFFL GRB	21AL07GE1000	27	2	91	0.11	9.6	8.64	6.31		0.163	4.65	4.6	0.64	11.1	0.4	36	0.009	0.88
GR PRAIR SEW EFFL GRB	21AL07GE1000	27	2	91			8.8								0.5			
P&G SECPND LAG EFFCMP	20AL07GE8001	26	2	91	5.21	7.6	0.32	0.06		0.066	0.08	0.08	25.8	276	34.2	887	0.377	70
P&G SECPND LAG EFFCMP	20AL07GE8001	26	2	91	5	7.2	0.34	0.06		0.071	0.08	0.14	25.3	272	31.2	877	0.435	68.8
P&G STORMSEW EFF GRAB	20AL07GE8003	27	2	91			0.12								8.2			
P&G STORMSEW EFF GRAB	20AL07GE8003	27	2	91	0.25	0.36		0.03		0.005	0.135	0.014	11.7	11			0.073	1.76
P&G FOAM PND EFF GRAB	20AL07GE8006	27	2	91			0.34								33.9			

STATION	CODE	D	M	Y	COLI TOTAL NO/DL 360**L	COLI FECAL NO/DL 360**L	CHLORDs EPUTH MG462 067**L
WAPITI R AT HWY40BR-C	00AL07GE2015	25	2	91			1.1
WAPITI R AT HWY40BR-C	00AL07GE2015	25	2	91			L1.0
WAPITI R AT HWY40BR-C	00AL07GE2015	25	2	91			L1.0
WAPITI R AT HWY40BR-C	00AL07GE2015	25	2	91			L1.0
WAPITI R AT HWY40BR-C	00AL07GE2015	25	2	91			L1.0
WAPITI R AT HWY40BR-C	00AL07GE2015	27	2	91	80	L4.	
WAPT R 5KD GR P STP-R	00AL07GE2250	26	2	91			L1.0
WAPT R 5KD GR P STP-R	00AL07GE2250	26	2	91			L1.0
WAPT R 5KD GR P STP-R	00AL07GE2250	26	2	91			L1.0
WAPT R 5KD GR P STP-R	00AL07GE2250	26	2	91			135.8
WAPT R 5KD GR P STP-R	00AL07GE2250	26	2	91			140.3
WAPT R D P&G HAULRD-C	00AL07GE2300	27	2	91	270	L4.	
WAPT R D P&G HAULRD-C	00AL07GE2300	27	2	91			3.6
WAPT R D P&G HAULRD-C	00AL07GE2300	27	2	91			17.7
WAPT R D P&G HAULRD-C	00AL07GE2300	27	2	91			3.8
WAPT R D P&G HAULRD-C	00AL07GE2300	27	2	91			16.9
WAPT R D P&G HAULRD-C	00AL07GE2300	27	2	91			6.5
WAPT R 25KD P&G EFL-L	00AL07GE2500	25	2	91			75.8
WAPT R 25KD P&G EFL-L	00AL07GE2500	25	2	91			144.6
WAPT R 25KD P&G EFL-L	00AL07GE2500	25	2	91			49.8
WAPT R 25KD P&G EFL-L	00AL07GE2500	25	2	91			46.8
WAPT R 25KD P&G EFL-L	00AL07GE2500	25	2	91			31.5
WAPITI R AT R R BR-C	00AL07GE3054	26	2	91			56.8
WAPITI R AT R R BR-C	00AL07GE3054	26	2	91			91.1
WAPITI R AT R R BR-C	00AL07GE3054	26	2	91			122.8
WAPITI R AT R R BR-C	00AL07GE3054	26	2	91			85.1
WAPITI R AT R R BR-C	00AL07GE3054	26	2	91			100.9
WAPITI R AT R R BR-LR	00AL07GE3060	27	2	91	208	20	
WAPT R10KD P&G EFL-RC	00AL07GE3500	26	2	91			24.5
WAPT R10KD P&G EFL-RC	00AL07GE3500	26	2	91			20.9
WAPT R10KD P&G EFL-RC	00AL07GE3500	26	2	91			12
WAPT R10KD P&G EFL-RC	00AL07GE3500	26	2	91			14.7
WAPT R10KD P&G EFL-RC	00AL07GE3500	26	2	91			14.3
WAPT R10KD P&G EFL-RC	00AL07GE3500	26	2	91	200	20	
WAPT R 1KU BEAR R-C	00AL07GE4050	26	2	91			54.3
WAPT R 1KU BEAR R-C	00AL07GE4050	26	2	91			38.3
WAPT R 1KU BEAR R-C	00AL07GE4050	26	2	91			67.1
WAPT R 1KU BEAR R-C	00AL07GE4050	26	2	91			44.2
WAPT R 1KU BEAR R-C	00AL07GE4050	26	2	91			61.9
WAPT R 10KU MOUTH	00AL07GE4900	26	2	91			L1.0
WAPT R 10KU MOUTH	00AL07GE4900	26	2	91			L1.0
WAPT R 10KU MOUTH	00AL07GE4900	26	2	91			L1.0
WAPT R 10KU MOUTH	00AL07GE4900	26	2	91			9.5
WAPT R 10KU MOUTH	00AL07GE4900	26	2	91			18.5
WAPT R U SMOKY R -C	00AL07GJ1000	26	2	91			L1.0
WAPT R U SMOKY R -C	00AL07GJ1000	26	2	91			L1.0
WAPT R U SMOKY R -C	00AL07GJ1000	26	2	91			L1.0
WAPT R U SMOKY R -C	00AL07GJ1000	26	2	91			L1.0
WAPT R U SMOKY R -C	00AL07GJ1000	26	2	91			L1.0
SMOKY R U WAPITI R-R	00AL07GF1015	1	3	91	28	L4	
SMKYR 1KU PUSKWAU R-C	00AL07GJ2030	5	3	91	60	L4	
L SMOKY R NR MOUTH	00AL07GH1500	5	3	91	28	4	
SMOKY R AT WATINO-C	00AL07GJ2060	6	3	91	48	L4	
SMOKY R NR MOUTH-C	00AL07GJ5000	11	3	91	12	L4	
GR PRAIR SEW EFFL GRB	21AL07GE1000	27	2	91	480	220	
P&G SECPND LAG EFFCMP	20AL07GE6001	26	2	91	100	60	
P&G STORMSEW EFF GRAB	20AL07GE6003	27	2	91	27000		

Results as mg/L unless noted ** - more than one analytical code may be included; K - kilometre, U - upstream of, D - downstream of, L - left, C - centre, R - right, LR - left/right comp ; F - field measurement; L - lab analysis

APPENDIX 2. WATER QUALITY DATA FROM MEDIUM AND LONG TERM RIVER NETWORK SITES.

- Wapiti River at Hwy 40 near Grande Prairie	00AL07GE2015
- Wapiti River near Mouth	00AL07GJ1000
- Smoky River at Watino	00AL07GJ0001

WATER QUALITY DATA - WAPITI RIVER AT HWY 40 NEAR GRANDE PRAIRIE - 09AL07GE2015

D	M	Y	DISCHG M3/S 071~F	TEMP DEG.C 020~F	PH 102~F	COND US/CM 029~F	OXYGEN METER O2 081~F	OXYGEN WINKLR O2 081~L	NON FILT RES 104~L	TURB NTU 029~L	COLOUR TRUE REL UN 020~L	ODOUR THRESH NO 020~L	NON FILT RES 104~L	FILT RES 104~L	TDS CALCD 002~L	TDS (DIFF) 002~L	COND US/CM 020~L	ALK TOTAL CaCO3 101~L	HARDNS TOTAL CaCO3 100~L
1	3	89						12.5	L 4000		5		L 4000	210				159	195.24
1	3	89		0		250		11.9	L 4000		5		L 4000	210				162	197.24
1	3	89						12.5	L 4000		10		L 4000	210				161	196.4
6	3	89	4.95																
2	10	89		8.9	8.7	325	10.4		30	42	30	1	30	180			324	154	167.6
2	10	89							28	41	30	1	28	180			326	156	164.5
2	10	89							28.7	42	30	1	28.7	170			323	156	164.8
16	2	90	13.2																
23	2	90	13																
27	2	90		0	8.2	371	11.5	12	9	2.2	10	1	9	220			385	178	194.07
27	2	90						12	9	1.6	10	1	9	220			381	179	194.39
27	2	90						12.04	13	1.6	10	1	13	220			385	177	195.57
27	2	90	13																
11	10	90		3	8.3	358	12.1	12.18	3.6	4.2	L5	L1	3.6	215			347	160	160.5
8	1	91						11.50	1.6	1.5	L5	L1	1.6	227			400	175	196.7
5	2	91		0	7.76	385	12.1	11.86	5.6	12.6	L5	L1	5.6	227			424	179	193.5
27	2	91	16										13	222	212	209	384	169	186
27	2	91		0.02	8	361	12.63	12.28	13		8	1	13						
27	2	91						12.18	13		6								
19	3	91		0.08	7.95	398	12.64	12.46	15.6	0.4	L5	L1	15.6	223			403	164	199
2	5	91		6.3	8.2	250	11.1	11.04	175	176	40	L1	175	131			242	110	120.7
22	8	91		17.7	8.2	249	9	8.85	7.6	1.3	L5	L1	7.6	139			260	114	124.5
5	11	91		-0.4	7.8	351	12.7	13.54	35	18	L5	L1	35	195			346	160	167.4
8	1	92							2.4	1.5	L5	L1	2.4	215			373	170	184.8
5	2	92							L0.4	0.4	L5	L1	L0.4	196			367	150	179.4

D	M	Y	PH 103~L	Na DISS 111~L	K DISS 181~L	Ca DISS 201~L	Mg DISS 121~L	HCO3 LAB CALCD 062~L	CO3 LAB CALCD 063~L	Cl DISS 172~L	SO4 DISS 163~L	F DISS 091~L	SILICA REACT SIO2 141~L	CN 066~L	S- DISS 161~L	Li TOTAL 030~L	Be TOTAL 040~L	Be DISS 041~L	B TOTAL 050~L
1	3	89	7.85	4.4	0.38	56.2	13.3	193.82	L5000	0.9	36		3.54						
1	3	89	7.88	4.5	0.48	57	13.3	197.48	L5000	0.9	36.7		2.6						
1	3	89	7.88	4.5	0.41	56.5	13.4	196.26	L5000	0.9	36.5		3.6						
2	10	89	8.31	7	0.87	48.5	11.3	188	L5000	0.8	17.5	0.1	3.9	L0.0010	0.003	L0.0050	L0.0010		0.01
2	10	89	8.24	7.2	0.92	47.4	11.2	190	L5000	0.7	17.2	0.1	3.84	L0.0010	0.006	L0.0050	L0.0010		0.02
2	10	89	8.2	7	0.91	47.2	11.4	189	L5000	0.7	17.4	0.11	3.8	L0.0010	0.003	L0.0050	L0.0010		0.01
27	2	90	7.85	7.5	0.67	55.4	13.5	216.98	L5000	1.1	32.2	0.12	3.72	0.001	L.001	0.02	0.001		0.01
27	2	90	7.88	7.5	0.67	55.2	13.7	218.2	L5000	1	32.3	0.11	3.72	0.001	L0.0100	0.02	L0.0010		L0.0100
27	2	90	7.87	7.5	0.67	56	13.5	215.76	L5000	1	32.2	0.1	3.72	0.001	L0.0100	0.02	L0.0010		L0.0100
11	10	90	7.8	24.7	0.7	46.9	10.5	L195.0	L0.5	0.5	34.2	0.07	3.05		L.001				
8	1	91	8.05	7.53	0.7	57.1	13.1	213.3	L0.5	1.5	40.2	0.08	3.62						
5	2	91	7.99	9.1	0.73	56	13	218.2	L0.5	0.7	38.1	0.08	3.67		L.001				
27	2	91	8.01	7	0.6	53	13	206		L.001	36	0.1	3.3		L.001			L.001	
27	2	91																	
19	3	91	8.16	8.85	0.75	57.7	13.3	199.9	L0.5	0.8	42	0.1	3.42		L.001				
2	5	91	8.03	4.85	0.79	33.8	8.8	134.1	L0.5	3.6	12.5	0.07	3.8		L0.001				
22	8	91	8.15	2.75	0.44	35.8	8.5	139	L0.5	0.6	21	0.11	2.7						
5	11	91	8.05	5.96	0.58	48.2	11.4	195	L0.5	1	30.1	0.1	3.35		L0.001				
8	1	92	7.87	6.64	0.57	54	12.1	207.2	L0.5	1.7	35.9	0.09	3.61		L0.001				
5	2	92	7.72	6.7	0.44	52	12	182.9	L0.5	1.3	32.4	0.11	3.69						

D	M	Y	B DISS 051~L	Al TOTAL 130~L	Al EXT 130~L	V TOTAL 230~L	Cr TOTAL 240~L	Mn TOTAL 250~L	Mn EXT 253~L	Fe TOTAL 260~L	Fe EXT 263~L	Co TOTAL 270~L	Ni TOTAL 280~L	Cu TOTAL 290~L	Cu EXT 293~L	Zn TOTAL 300~L	Zn EXT 303~L	As TOTAL 330~L
1	3	89			0.03				0.01		L0.100				0.001		0.007	
1	3	89			0.01				0.004		L0.100				L0.010		0.005	
1	3	89			0.03				0.008		0.04				L0.010		0.005	
2	10	89		0.77		0.003	0.002	0.023		1.54		L0.0010	L0.0010	0.003		0.005		0.0012
2	10	89		0.83		0.002	0.003	0.020		1.61		L0.0010	L0.0010	0.003		0.006		0.0009
2	10	89		0.56		0.002	0.001	0.024		1.6		L0.0010	L0.0010	0.003		0.003		0.001
27	2	90		0.08		0.004	0.009	0.007		0.09		L0.0010	L0.0010	0.002		0.002		L0.0002
27	2	90		0.08		0.002	0.008	0.007		0.1		L0.0010	L0.0010	L0.0010		0.002		L0.0002
27	2	90		0.08		0.002	0.008	0.007		0.1		L0.0010	L0.0010	0.001		0.002		0.0002
11	10	90						0.017						0.004		0.004		
8	1	91	L0.01					0.02						L0.001		0.007		
5	2	91	L0.01					0.014						L0.001				
27	2	91			0.086	L.002	L.001	0.014		0.334		L.001	0.001	L.001		0.002		0.0003
19	3	91	0.02					0.025						0.002		0.01		
2	5	91						0.064						0.007		0.019		
22	8	91						0.009						L0.001		0.01		
5	11	91						0.066						0.004		0.006		
8	1	92						0.007						L0.001		0.003		
5	2	92						0.011						L0.001		0.003		

D	M	Y	Se TOTAL 340**L	Sr TOTAL 380**L	Mo TOTAL 420**L	Ag TOTAL 470**L	Cd TOTAL 480**L	Cd EXT 483**L	Sb TOTAL 510**L	Ba TOTAL 560**L	Hg TOTAL 800**L	Hg TOTAL UG/L 800**L	Pb TOTAL 820**L	Pb EXT 82302L	N PARTIC 078**L	N TKN 070**L	N TOTAL NH3 075**L	N TOTAL NH3 075**L	N DISS NO2 NO3 071**L
1	3	89						L0010								0 3	L0100		0.084
1	3	89						L0010								0 18	L0100		
1	3	89						L0010								0 16	L0100		0.088
1	3	89														0 16	L0100		
1	3	89														0 2	L0100		0.094
1	3	89														0 2	L0100		
2	10	89	L 0002	0 21	L 0010	L 0010	L 0010		L 0002	0 13		L 0500	L 0020			0 5	0 01		L 0030
2	10	89	L 0002	0 22	0.006	L 0010	L 0010		L 0002	0 14		L 0500	L 0020			0 46	0 01		L 0030
2	10	89	L 0002	0 22	0.001	L 0010	L 0010		L 0002	0 14		L 0500	L 0020			0 46	0 01		L 0030
27	2	90	0 0003	0 25	0 003	L 0010	L 0010		L 0002	0 12		L 0500	L 0020			0 16	0 01	0 01	0 085
27	2	90	L 0002	0 25	L 0010	L 0010	L 0010		L 0002	0 12		L 0500	L 0020			0 14	0 01		0 085
27	2	90	L 0002	0 25	0 002	L 0010	L 0010		L 0002	0 12		L 0500	L 0020			0 1	0 01		0 084
11	10	90										L0 05				0 16	L0 01		L0 003
8	1	91										L0 05				0 12	L0 01		0 078
5	2	91										L0 05				0 16	0 03		0.073
27	2	91	L 0001		L 001		0 001			0 114	L 0001			L 002	0 03	0 1	0 02		
27	2	91													0 04	0 08	0 02		
19	3	91										L0 05				0 14	L0 01		0 058
2	5	91										L0 05				0 54	L0 01		0 046
22	8	91										L0 05				0 32	L0 01		L0 003
5	11	91										L0 05				0 36	L0 01		0 072
8	1	92										L0 05				0 16	L0 01		0 056
5	2	92										L0 05				0 24	L0 01		0 059

D	M	Y	N DISS NO2 NO3 071**L	N DISS NO2 072**L	P TOTAL 150**L	P TOTAL 154**L	P DISS 151**L	P DISS 151**L	CARBON TOTAL ORG 060**L	CARBON PARTIC TOTAL 069**L	CARBON DISS ORG 061**L	BOD 5 DAY 082**L	BOD DISS 5 DAY 082**L	COD TOTAL 083**L	OIL AND GREASE 065**L	PHENOL 065**L	TANNIN AND LIGNIN 065**L	SURFAC ANION MBAS 107**L
1	3	89			0.003				1 4		1 1	1 5		8 5		0 002	0 2	
1	3	89			0 006				1 3		1 2			L5 000				
1	3	89			0 006				1 4		1 3	1 7		L5 000		0 001	0 3	
1	3	89			0 004				1 5		1 4			L5 000				
1	3	89			L 0030				1 4		1 3	0 3		L5 000		L 0010	0 3	
1	3	89			0 003				1 4		1 4			L5 000				
2	10	89			0 037		0 004		6 6		6 3	0 5	0 3	10	0 3	L 0010	0 5	0 06
2	10	89			0 037		0 003		6 6		6 3	0 8	0 2	10	0 3	L 0010	0 5	0 06
2	10	89			0 036		0 004		6 5		6 3	0 7		45	0 2	L 0010	0 5	0 06
27	2	90				0 0057		0 0023	2 5		2 5	0 05	0 12	20 2		L 001	0 4	
27	2	90				0 0052		0 0025	2 5		2 5	0 1		10 1		L 0010	0 4	
27	2	90				0 0052		0 0023	2 6		2 6	0 04		10 1		L 0010	0 35	
11	10	90			0 007	0 0088	L0 003	0 0009	2 1		1 8					L0 001	0 3	
8	1	91			0 021	0 0114	0 02	0 0012	3 9		3 8	1 2		L5		0 003	0 5	
5	2	91			0 009	0 0038	0 007	0.0018	2 2		2 2	L0 1		10		L0 001	0 5	
27	2	91	0 06	L 001		0 008	0 003			0 07	2 3	0 5		6		L 001	L 05	
27	2	91	0 06			0 01	0 002			0 22	2 2	0 4				L 001	L 05	
19	3	91			0 015	0 0060	0 004	0 002	2 2		2	0 3		L5		L0 001	0 3	
2	5	91			0 138		0 011		10 2		9 4					0 003	0 8	
22	8	91			0 021	0 0125	0 017	0 0023	2		2					L0 001	0 2	
5	11	91			0 037	0 0403	L0 003	0 0032	2 3		2 2					L0 001	0 5	
8	1	92			L0 003		L0 003		1 7		1 7	L0 1		L5		L0 001	0 5	
5	2	92			0 007		L0 003		2 2		2 2	0 4		20		L0 001	L0 1	

D	M	Y	COLI TOTAL NO/DL 360**L	COLI FECAL NO/DL 360**L	CHLORO PHYLLa MG/M3 067**L	CHLOROa EPLITH MG/M2 067**L
1	3	89	6	L1 000		
1	3	89	L1 000	L1 0		
1	3	89	8	L1 000		
2	10	89	60	32	0 3	L1
2	10	89	100	12	0 3	
2	10	89	148	12	0 3	
27	2	90	196	L4	L0 1	
27	2	90	184	L4		
27	2	90	212	4		
25	2	91				1 1
25	2	91				L1 0
25	2	91				L1 0
25	2	91				L1 0
25	2	91				L1 0
27	2	91	80	L4		

Results as mg/L unless noted ** - more than one analytical code may be included, k - kilometre, U - upstream of, D - downstream of, L - left, C - centre, R - right, L/R - left/right comp., F - field measurement, L - lab analysis

WATER QUALITY DATA - WAPITI RIVER NEAR MOUTH (u/s of Smoky R.) - 00AL07GJ1000

D M Y	TEMP DEG.C 020**F	PH 103**F	COND US/CM 020**F	OXYGEN METER O2 081**F	OXYGEN WINKLR O2 081**L	TURB NTU 020**L	COLOUR TRUE REL UN 020**L	ODOUR THRESH NO 020**L	NON FILT RES 104**L	FILT RES 104**L	TDS CALCD 002**L	TDS (DIFF) 002**L	COND US/CM 020**L	ALK TOTAL CaCO3 101**L	HARDNS TOTAL CaCO3 106**L	PH 103**L
3 3 89					8.4		250		6.49	570				179		7.9
3 3 89	0		735		9											
3 3 89					8.6											
4 10 89	8.2	8.2	374	10.7		48	60	1	38.4	206.1			378	156	163.35	8.04
1 3 90	-0.2	8.2	568	10.1	9.89	5	120	64	10	330			588	184	197.4	8.09
1 3 90					9.79											
1 3 90					9.74											
11 10 90	3.6	8.3	403	12.2	12.18	12	20	L1.	7.6	232			393	162	174.2	7.79
8 1 91						3.9	60	8	3.2	280			488	185	199.3	7.86
8 1 91	-0.4	7.3	533	10.8		28	50	2	82.8	315			567	182	206.4	7.93
8 1 91						5.5	50	2	10.8	332			556	182	206.7	7.94
8 1 91						8.7	60	2	22.3	337			554	185	208.9	7.96
6 2 91	0	7.4	568	10.76		21.5	60	2	17.3	343			617	190	203.6	7.94
28 2 91							79	4	16	348	293	332	511	177	207	7.76
19 3 91	-0.04	7.95	548	12.07		1	80	2	21.6	306			556	173	206.4	8.05
19 3 91						0.8	80	2	22.4	308			556	174	207.7	8.04
19 3 91						0.9	80	2	24	305			556	172	206.7	8.04
19 3 91																
2 5 91	7.1	8.4	266		10.94	211	40	L1.	243	138			251	110	121.5	8
22 8 91	19.1	8.3	290	9.1	8.84	1.3	20	L1.	6.4	163			307	121	128	8.15
5 11 91	-0.3	8.2	442	12	12.4	10	40	L1.	5.6	244			426	170	176.6	7.99
8 1 92						4.2	70	8	2.4	281			490	186	198.9	7.86
8 1 92																
8 1 92																
5 2 92						1	70	2	1.2	280			493	160	191.9	7.63

D M Y	Na DISS 111**L	K DISS 191**L	Ca DISS 201**L	Mg DISS 121**L	HCO3 LAB CALCD 062**L	CO3 LAB CALCD 063**L	Cl DISS 172**L	SO4 DISS 163**L	F DISS 091**L	SILICA REACT SIO2 141**L	CN 066**L	S- DISS 161**L	Li TOTAL 030**L	Bai TOTAL 040**L	Be DISS 041**L	B TOTAL 050**L	B DISS 051**L
3 3 89	81.5	2.2	81.5	14.6	218	L.5000	111	105		4.5							
3 3 89																	
4 10 89	15	1.28	46.9	11.2	190.16	L.5000	12.3	24.3	0.1	4.2	L.0010	0.014	0.012	L.0010		0.02	
1 3 90	39.8	1.55	56.9	13.4	224.3	L.5000	38.5	67	0.14	3.9	L.0010	0.057	0.02	0.001		0.02	
11 10 90	18.4	1.58	50.4	11.7	197.5	L0.5	8.1	42.9	0.13	2.25		0.002					
8 1 91					225.5	L0.5			0.11	3.98							
8 1 91	39.4	1.88	60.5	13.4	221.9	L0.5	34.5	61.2	0.12	4.28		0.042					L0.01
8 1 91	40	1.87	60.8	13.3	221.9	L0.5	33.5	71	0.12	4.2		0.024					L0.01
8 1 91	39.8	1.86	61.5	13.4	225.5	L0.5	35.5	72	0.12			0.042					L0.01
6 2 91	47.4	2.06	59.7	13.2	231.6	L0.5	31.2	73.4	0.1	4.35		0.038					0.02
28 2 91	27	8.2	60	14	216		26.2	51	0.12	20.1		0.023			L.001		
19 3 91	35.8	1.76	60.5	13.4	210.9	L0.5	30	59	0.1	3.72		0.034					0.02
19 3 91	35.8	1.74	61.2	13.3	212.1	L0.5	29.5	60	0.1	3.72							0.02
19 3 91	35.6	1.59	60.8	13.3	209.7	L0.5	29	59.5	0.11	3.65		0.035					0.02
19 3 91												0.035					
2 5 91	6.1	1.02	34.1	8.8	134.1	L0.5	4.1	16.4	0.08	3.8		L0.001					
22 8 91	9.28	0.67	37.2	8.5	147.5	L0.5	7.8	25.6	0.1	2.55							
5 11 91	20.8	1.41	50.9	12	207.2	L0.5	12.7	43	0.07	3.37		0.016					
8 1 92	25.6	1.15	58.5	12.8	226.7	L0.5	22.7	47	0.11	3.98		0.015					
8 1 92												0.013					
8 1 92	25.8	1.17	58.5	12.9			21.9	46.6				0.013					
5 2 92	31.6	1.32	57	12	195	L0.5	26.7	54.1	0.12	3.79							

D M Y	Al TOTAL 130**L	Al EXT 130**L	V TOTAL 230**L	Cr TOTAL 240**L	Mn TOTAL 250**L	Mn EXT 253**L	Fe TOTAL 260**L	Fe EXT 263**L	Co TOTAL 270**L	Ni TOTAL 280**L	Cu TOTAL 290**L	Cu EXT 293**L	Zn TOTAL 300**L	Zn EXT 303**L	As TOTAL 330**L	Se TOTAL 340**L
3 3 89		0.09				0.1		0.14				0.001		0.014		
4 10 89	0.97		0.004	0.006	0.041		1.91		L.0010	0.008	0.005		0.012		0.0011	L.0002
1 3 90	0.17		0.005	0.018	0.038		0.23		L.0010	0.004	0.001			0.01	0.0004	L.0002
11 10 90					0.036						0.004		0.012			
8 1 91					0.045						L0.001		0.005			
8 1 91					0.084						0.002		0.007			
8 1 91					0.09						0.002		0.009			
8 1 91					0.085						0.002		0.013			
6 2 91					0.13						0.002		0.012			
28 2 91		0.139	0.002	0.002	0.065		0.427		L.001	0.003	0.002		0.005		0.0004	L.0001
19 3 91					0.1						0.002		0.012			
19 3 91					0.096						0.004		0.016			
19 3 91					0.099						0.002		0.024			
2 5 91					0.11						0.007		0.021			
22 8 91					0.028						L0.001		0.009			
5 11 91					0.066						0.002		0.005			
8 1 92					0.043						L0.001		0.005			
5 2 92					0.06						0.002		0.008			

D M Y	Sr TOTAL 380**L	Mo TOTAL 420**L	Ag TOTAL 470**L	Cd TOTAL 480**L	Cd EXT 483**L	Sb TOTAL 510**L	Ba TOTAL 560**L	Hg TOTAL 800**L	Hg TOTAL UG/L 800**L	Pb TOTAL 820**L	Pb EXT 823**L	N PARTIC 079**L	N TKN 070**L	N TOTAL NH3 075**L	N TOTAL NH3 075**L	N DISS NO2NO3 071**L	N DISS NO2 072**L
3 3 89					0.001						L.002		1.28	0.28		0.175	
3 3 89														0.3		0.17	
3 3 89														0.29		0.178	
4 10 89	0.21	0.008	L.0010	L.0010			0.13			L.0020			0.6	0.03		0.026	
4 10 89														0.03			
4 10 89														0.03			
1 3 90	0.26	0.005	L.0010	L.0010		L.0002	0.14		L.0500	0.004			0.64	0.16	0.168	0.163	0.009
1 3 90														0.16			
1 3 90														0.16			
11 10 90									L0.05				0.4	L0.01		0.112	
8 1 91									L0.05				0.64	0.31		0.111	
8 1 91									L0.05				0.68	0.2		0.228	
8 1 91									L0.05				0.74	0.2		0.242	
8 1 91									L0.05				0.72	0.2		0.244	
6 2 91									L0.05				1.04	0.28		0.185	
28 2 91		0.002		0.005			0.122	L.0001			L.002	0.18	0.47	0.12		0.134	0.007
28 2 91														0.12			
28 2 91														0.12			
19 3 91									L0.05				0.72	0.05		0.086	
19 3 91									L0.05				0.66	0.04		0.087	
19 3 91									L0.05				0.66	0.04		0.085	
2 5 91									L0.05				0.62	0.02		0.047	
22 8 91									L0.05				0.56	L0.01		L0.003	
5 11 91									L0.05				0.72	0.04		0.048	
8 1 92									L0.05				0.64	0.3		0.121	
5 2 92									L0.05				0.76	0.2		0.097	

D	M	Y	P TOTAL 150**L	P TOTAL 154**L	P DISS 151**L	P DISS 151**L	CARBON TOTAL ORG 060**L	CARBON PARTIC TOTAL 069**L	CARBON DISS ORG 061**L	BOD 5 DAY 082**L	BOD DISS 5 DAY 082**L	COD TOTAL 083**L	OIL AND GREASE 065**L	PHENOL 065**L	TANNIN AND LIGNIN 065**L	SURFAC ANION MBAS 107**L
3	3	89	0.21				22.9		22.4	5.7		47		0.044	9	
3	3	89								5.7						
3	3	89								6.3						
4	10	89	0.078		0.019		12.5		11.8	0.6	0.2	23	0.4	0.005	1.9	0.12
4	10	89								0.7	0.4					
4	10	89								0.5						
1	3	90		0.1218		0.0797	11.8		11.4	2.9	2.7	39.2		0.03	5	
1	3	90								2.8						
1	3	90								2.9						
11	10	90	0.052	0.0588	0.026	0.0247	4.5		4.1					L0.001	0.8	
8	1	91	0.088		0.073		11.9		11.5	0.7		40		0.002	3.4	
8	1	91	0.139	0.1359	0.076	0.0548	14.9		14.4	3.3		60.7		0.016	4.9	
8	1	91	0.134	0.1497	0.072	0.0546	15.3		15	3.4		45		0.014	6.1	
8	1	91	0.134	0.1428	0.06	0.0557	15.6		15.5	2.8		40		0.014	4.9	
6	2	91	0.141	0.1363	0.077	0.0675	17.6		16	4.8		69		0.02	5.1	
28	2	91		0.076	0.028			1.18	12.2	1.7		37		0.018	2.21	
28	2	91								1.5						
28	2	91								1.6						
19	3	91	0.067	0.0589	0.007	0.0085	13.3		13.3	2.8		50		0.013	4.6	
19	3	91	0.066	0.0663	0.005	0.0071	13.3		12.7	2.8		40		0.013	4.6	
19	3	91	0.069	0.056	0.003	0.0076	13.4		11.4	2.9		50		0.014	4.6	
2	5	91	0.179		0.011		11.5		10.5					0.003	1.1	
22	8	91	0.037	0.0251	0.036	0.0093	5.2		5.1					L0.001	1	
5	11	91	0.05	0.0597	0.019	0.0147	8.6		8					0.004	2.7	
8	1	92	0.086		0.078		11.2		11	0.8		40		0.002	3.2	
5	2	92	0.092		0.057		15		14.5	1.9		60		0.014	3.8	

D	M	Y	COLI TOTAL NO/DL 360**L	COLI FECAL NO/DL 360**L	CHLORO PHYLLa MG/M3 067**L	CHLOROa EPLITH MG/M2 067**L
3	3	89	530	10		
4	10	89	100	16	0.8	3.826
1	3	90	450	16	0.3	
26	2	91				L1.0
26	2	91				L1.0
26	2	91				L1.0
26	2	91				L1.0
26	2	91				L1.0

Results as mg/L unless noted. ** - more than one analytical code may be included; k - kilometre; U - upstream of; D - downstream of; L - left; C - centre; R - right; L/R - left/right comp.; F - field measurement; L - lab analysis

WATER QUALITY DATA - SMOKY RIVER AT WATINO -00AL07GJ0001 - 1987-91

D	M	Y	TEMP DEG.C 020**F	PH 103**F	COND US/CM 020**F	OXYGEN METER O2 081**F	OXYGEN WINKLR O2 081**L	NON FILT RES 104**L	TURB NTU 020**L	COLOUR APPAR REL UN 020**L	COLOUR TRUE REL UN 020**L	ODOUR THRESH NO 020**L	RES TOTAL 104**L	NON FILT RES 104**L	FILT RES 104**L	TDS CALCD 002**L	TDS (DIFF) 002**L	COND US/CM 020**L	ALK TOTAL CaCO3 101**L
19	2	87	0.5				10.8	6	2.8		30		306	6	300	274.07		477	180
18	3	87	0.5				10	10	4.6	100			320	10	310			510	188
22	4	87	4.9	8.3	263	11.7		110	142	120			260	110	150			266	110
27	5	87	17.9	7.9	265	8.6		125	92	100			376	125	144			268	115
23	6	87	14.5	8.1	217	9.1		256	152	100				256	115			245	88.5
20	7	87	17.2	7.9	267	9.3		54	50	60				54	150			267	112
17	8	87	15			11.8		160	108	70				160	180			322	125
28	9	87	12.2	8.3	345	9.8		12.4	12	40				12.4	200			346	157
21	10	87	3.2				12.4	4.8	6.2	45				4.8	255			418	186
26	11	87	0.2	8.5	458		13.3	4.8	8.6	40	30	1		4.8	260			460	174
17	12	87	0	8.4			14.7	5.6	4	50		1		5.6	350			598	224
12	1	88	-1	7.9			11.2	3.6	4	50		1		3.6	360			606	213
9	2	88	0	8.2		9.6		3.6	3.5		50			3.6	325			581	192
24	3	88	0	8			12.6	20.4	22		50			20.4	260			471	151
20	4	88	6.5	8.194			11.3	328	282		40			328	170			323	135
12	5	88	11.4	8.3			8.5	352	176		30			352	175			310	125
21	6	88	15.5	7.9			8.9	464	106		40			464	110			196	86.8
21	7	88	20.7	7.8	259	8.1		72	56		50			72	140			254	100
22	8	88	16.5	7.9	279	9.2		20	20		10			20	150			276	109
27	9	88						3.2	5		30			3.2	200			365	135
27	9	88	8.2	8.1	360	10.7													
3	11	88	0	8.1			13.5	6	7.6		40			6	210			389	139
30	11	88	0.2	8.7	529		12.85	154	5.4		50			154	320			649	193
15	12	88	0.2	8.5	527	12.6		2	4.8		60			2	320			546	190
25	1	89	1	7.3	550	9.4		4	3.6		60			4	350			582	183
28	2	89	-0.1	7.7	578	6.9		3.2	3.6		60			3.2	355			597	188
30	3	89	0.5	8.5	580	8.4		0.88	3.2		70			0.88	350			589	181
2	5	89	9.5	8.2	288	11		365	272		80			365	160			283	116
25	5	89	8.9	7.9	201	10.7		1637	925		114			1637	1908	111	271	203	87
22	6	89	14.8	8.6	225		9.4	100	72		20			100	308	122	208	229	98
26	7	89	18.1	8.2	245	8.4		113	88		39			113	290	142	177	245	112
28	8	89	12.5	8.3	265	10.2		332	172		70			332	136			247	113
5	10	89	7.2	8.2	334	11.2		43	50		40			43	186			338	147
31	10	89	1.3	8.6	334		10.2	4	7.8		30			4	189			350	147
29	11	89	0	8.7	367	13.5		22.8	20		40			22.8	202			382	155
14	12	89	0.4	8.5	401	13.5		17	9.6		40			17	245			429	179
24	1	90	0.1	8.5	455	11.4		2	4.8		30			2	260			458	182
22	2	90	-0.1	7.7	492	9.8		L.4000	0.68		40			L.4000	300			564	192
21	3	90						10	50		70			10	200			354	132
21	3	90	-0.3	7.7	349	11													
24	4	90	7.5	6.8	278		10.56	432	310		40			432	163			290	123
23	5	90	12	8.1	249		9.8	695	268		40			695	139			248	109
19	6	90	14.4	7.9	216	9.3	9.3	1390	568		80			1390	130			223	98
26	7	90	21.3	7.9	289	8.3	8.73	82	45		20			82	160			293	120
15	8	90	19.2	8.3	289	8.5	8.92	49	46		10			49	154			279	108
18	9	90	13.5	8.1	316	10.2	9.94	14.8	10		L5.			14.8	180			325	127
10	10	90	5.5	8.3	380	12	11.69	12.5	13		10	L1.		12.5	212			354	148
20	12	90						6.5	5.4		30			6.5	264			468	184
29	1	91						8.4	11.7		40	L1.		8.4	271			537	184
19	2	91						8.7	9.6		30			8.7	267			496	175
20	3	91						6.4	18.5		40	L1.		6.4	294			544	175
1	5	91						650	380		70			650	112			194	79.9
29	5	91						205	127		30	L1.		205	137			255	110
25	6	91						187	140		20			187	110			212	91
1	8	91						43	36		L5.			43	143			258	109
21	8	91						120	28		10	L1.		120	140			245	103
2	10	91						6.4	12.1		L5.			6.4	192			350	135
29	10	91						16	35		L5.	L1.		16	207				155
25	11	91						4.8	10		20			4.8	230			403	164
17	12	91						4.8	0.7		L5.			4.8	259			463	179

D	M	Y	HARDNS TOTAL CaCO3 106**L	PH 103**L	Na DISS 111**L	K DISS 191**L	Ca DISS 201**L	Mg DISS 121**L	HCO3 LAB CALCD 062**L	CO3 LAB CALCD 063**L	Cl DISS 172**L	SO4 DISS 163**L	F DISS 091**L	SILICA REACT SIO2 141**L	S- DISS 161**L	Be DISS 041**L	B DISS 051**L	B DISS UG/L 051**L	Al TOTAL 130**L
19	2	87	231	7.9	14	1	66	16	219.42		10	59	0.13	4.8			0.013		
18	3	87	236.4	8.63	20.6	1.03	66	17.4	219	L.5000	16.1	73.5	0.09	4.88			0.06		
22	4	87	128.75	8.14	9.3	1.8	35.2	9.9	134.09	L.5000	4.5	23	0.12	4.26			0.01		
27	5	87	131.57	8.12	5.8	0.9	36	10.1	140.19	L.5000	2.5	18.7	0.07	3.6					
23	6	87	97.739	7.76	3.6	0.66	27.9	6.8	107.88	L.5000	2.2	16	0.07	2.56			0.01		
20	7	87	132.57	8.45	5.3	0.7	36.4	10.1	132.63	1.92	3.4	25.2	0.1	2.45			0.09		
17	8	87	156.73	8.03	7.9	1.06	45.9	10.2	152.38	L.5000	5.5	32.5	0.08	4.76			0.08		
28	9	87	169.92	8.3	9.4	0.83	49.2	11.4	174.07	8.52	0.6	34	0.1	3.36			0.02		
21	10	87	198.8	7.69	14.4	0.99	56.8	13.8	226.73	L.5000	8.7	48	0.09	3.17			0.01		
26	11	87	213.36	8.25	13.3	0.87	61.8	14.3	212.11	L.5000	8.2	57.6	0.25	4.1			0.02		
17	12	87	278.62	8.07	21.3	1.15	80	19.1	273.06	L.5000	16.9	73.8	0.14	4.85			0.01		
12	1	88	271.8	8.05	26.4	1.26	78	18.7	260	L.5000	23	78.4	0.11	5.3			L0.01		
9	2	88	244.15	7.99	26.7	1.1	70	16.8	234.05	L.5000	28.6	58	0.18	4.5			0.01		
24	3	88	189	7.87	23	2.26	54.5	12.9	184	L.5000	17.7	53.8	0.12	3.85			0.01		0.13
20	4	88	143.75	8.3	12.4	1.55	41.2	9.9	164.57	L.5000	5.1	28.5	0.09	4.65			0.03		
12	5	88	157.26	8.15	7	0.9	44.3	11.3	152.38	L.5000	2.5	31.6	0.1	3.25			0.01		
21	6	88	95.416	7.33	4	0.75	27.3	6.6	105.81	L.5000	1.2	16	0.16	3.62			L0.01		
21	7	88	127	6.68	6	0.85	36.4	8.8	121	L.5000	6.5	19.9	0.15	4.62			0.02		
22	8	88	133.21	7.65	7	0.65	38.3	9.1	132.87	L.5000	4.1	28.8	0.096	2.3			0.01		
27	9	88	156.04	8.06	12.8	0.89	44.8	10.7	164.57	L.5000	9.1	39.1	0.12	1.62			0.02		
27	9	88																	
3	11	88	170.75	7.88	13.5	0.5	49.2	11.6	169.44	L.5000	10.8	44	0.12	3.15			0.02		
30	11	88	228.3	7.79	22.2	1.12	65.8	15.5	235.27	L.5000	18.8	79	0.14	4.66			L0.01		
15	12	88	262.34	7.81	20.3	0.96	75.3	18	231.61	L.5000	17.4	72	0.11	5			L.0100		
25	1	89	252.47	8.19	25	1.18	73	17	223.08	L.5000	25.8	94	0.16	5.1			0.02		
28	2	89	252.43	7.99	30	1.35	71.5	17.9	229.17	L.5000	29.6	90	0.16	5.5			L0.01		
30	3	89	245.75	8.14	30.8	1.3	68.5	18.1	220.64	L.5000	31.3	92	0.13	5.36			0.02		
2	5	89	129.96	8.23	8	0.96	37	9.1	141.4	L.5000	8.1	31.3	0.1	2.9			L.0100		
25	5	89	89	7.81	5	1.4	27	5.3	106			18	0.08	4.2		0.002			
22	6	89	108	8.09	3	0.5	31	7.4	119		1.2	20	0.07	3.1					
26	7	89	128	8.4	5	0.6	38	8	130	3		20	0.13	3.9					
28	8	89	125.4	7.84	5	1.08	36	8.6	137.75	L.5000	3	13.2	0.08	5.15			0.02		
5	10	89	159.5	8.15	8.7	1.25	44.7	11.6	179.19	L.5000	5.7	24.4	0.11	4.24			0.01		
31	10	89	169.6	8.12	8.2	0.83	46.6	12.9	179.2	L.5000	1.1	29.4	0.11	3.55			0.03		
29	11	89	170.73	8.08	11.6	1.05	48.7	11.9	188.95	L.5000	4.9	29.4	0.11	4.95			0.01		
14	12	89	186.64	8.08	15.3	1.1	52.1	13.7	218.2	L.5000	9.5	44	0.12	5.28			0.05		
24	1	90	207.09	7.62	15.8	1.15	58.8	14.6	221.86	L.5000	9.2	50.4	0.15	5.55			0.01		
22	2	90	236.66	7.87	20.7	1.12	67.5	16.5	234.05	L.5000	13.6	66	0.13	5.52			0.02		
21	3	90	132.89	7.32	15.5	5.5	36.2	10.3	160.91	L.5000	12.5	40.1	0.11	4.85				0.03	
21	3	90																	
24	4	90	127.79	6.83	9.3	1.7	36.3	9	149.94	L.5000	2.5	29	0.1	4.6			0.03		
23	5	90	113.16	7.53	5	1.21	31.6	8.3	132.87	L.5000	5.4	21.1	0.1	3.68			0.02		
19	6	90	101.72	7.58	4.9	1.41	29	7.1	119.46	L.5000	5.2	20.2	0.1	4.3			0.04		
26	7	90	132.7	7.67	6.3	0.95	37.6	9.4	L146.3	L0.5	2.5	30.5	0.1	3.28			L0.01		
15	8	90	128.5	7.47	6.1	0.86	36.6	9	131.7	L0.5	2.3	33.6	0.1	2.48					
18	9	90	155.6	7.99	6.3	0.81	44.3	10.9	154.8	L0.5	0.5	39.5	0.13	2.15			0.03		
10	10	90	171	7.81	8.7	0.9	47.8	12.5	180.4	L0.5	2.3	49.8	0.13	2.75	L.001		L0.01		
20	12	90	203.8	8.2	16.9	1.12	57.3	14.7	224.3	L0.5	9.7	52.5	0.13	4.52			0.02		
29	1	91	223.3	7.74	19.9	1.2	62.5	16.3	224.3	L0.5	9.9	49	0.12	4.75	0.01		L0.01		
19	2	91	211.2	8.1	17.9	1.12	59.3	15.3		L0.5	8.4	58.5	0.12	4.45	0.005		L0.01		
20	3	91	224.1	7.9	20.4	1.35	62	16.8	213.3	L0.5	10	77	0.13	4.75	0.007		L0.01		
1	5	91	99.8	7.83	5.1	1.22	27.9	7.3	97.4	L0.5	6.4	14.9	0.07	4.6			L0.01		
29	5	91	123.8	8.17	4.5	0.75	35.2	8.7	134.1	L0.5	1.1	20	0.08	3.86	L0.001		0.04		
25	6	91	101	8.01	3.2	0.55	27.9	7.6	110.9	L0.5	0.9	14.8	0.17	3.3			L0.01		
1	8	91	128	8.04	4.3	0.59	37.2	8.5	132.9	L0.5	1.7	23.8	0.08	4.06			0.02		
21	8	91	130	8.02	5.2	0.49	37	9.1	125.6	L0.5	4	21.9	0.08	3.4			0.03		
2	10	91	161.3	8.08	7.8	0.68	45.8	11.5	164.6	L0.5	4.1	40.5	0.09	2.8			L0.01		
29	10	91	174.6	7.82	9.19	0.88	49.1	12.6	188.9	L0.5	2.3	38.4	0.1	4	0.003		L0.01		
25	11	91	190.6	8.07	11.4	0.75	54	13.5	199.9	L0.5	3.3	46.7	0.1	4.32			L0.01		
17	12	91	206.3	7.85	14.6	0.96	57	15.5	218.2	L0.5	6.2	55.6	0.13	4.84			L0.01		

D M Y	Al EXT 130**L	Al DISS 131**L	V TOTAL 230**L	V EXT 233**L	Cr TOTAL 240**L	Mn TOTAL 250**L	Mn EXT 253**L	Mn DISS 251**L	Fe TOTAL 260**L	Fe EXT 263**L	Fe DISS 261**L	Co TOTAL 270**L	Co EXT 273**L	Ni TOTAL 280**L	Ni EXT 283**L	Cu TOTAL 290**L	Cu EXT 293**L
19 2 87						0.01				0.15							
18 3 87				L.0010		0.008		0.007	0.07		0.05		L.0010		0.004		0.004
22 4 87								0.009			0.18						
27 5 87	L.0100							L.0040	0.3		0.3						
23 6 87				0.001				L.0040			0.46		0.002		0.01		0.006
20 7 87								L.0040			L.0100						
17 8 87				0.003				0.007			0.13		L.0010		0.005		0.008
28 9 87								0.009			0.05						
21 10 87				L.0010				0.021			0.04		0.002		L.0010		L.0010
26 11 87								0.036			0.03						
17 12 87								0.023			0.05						
12 1 88	0.03	0.03		L.0010				0.018			0.05		L.0010		0.002		0.001
9 2 88		0.02						0.016			0.05						
24 3 88		0.02						0.035			0.15						
20 4 88	0.98	0.02						0.013			0.03						
12 5 88	2.1	L.0100		0.007				0.006			0.02		0.005		0.01		0.008
21 6 88	0.8	L.0100						L.0040			0.06						
21 7 88	0.56	L.0100						L.0040			0.08						
22 8 88	0.14	0.02		L.0010				L.0040			0.02		L.0010		0.002		0.001
27 9 88	0.04	0.01		L.0010				0.011			0.03		L.0010		L.0010		L.0010
3 11 88	0.09	0.01		L.0010				0.031			0.03		L.0010		0.001		L.0010
30 11 88	0.07	0.02						0.017			0.06						
15 12 88	0.05	0.04						0.008			0.02						
25 1 89	0.07	0.03		L.0010				0.017			0.05		L.0010		L.0010		L.0010
28 2 89	0.05	0.01						0.007			0.04						
30 3 89	0.06	0.04						0.009			0.06						
2 5 89	1.22	0.02						0.004			0.08						
25 5 89		0.013	0.057		0.031	0.635	0.018	0.018	33.091	0.18	0.18	0.021		0.056		0.045	
22 6 89	0.371	0.013						0.01		0.37	L.01						
26 7 89	0.384	0.017						L.001		1.49	0.08						
28 8 89	1.44	0.03		0.002				0.004			0.19		0.003		0.01		0.008
5 10 89	0.42	0.04						0.007			0.11						
31 10 89	0.1	0.01		0.002				0.012			0.09		L.0010		L.0010		L0.001
29 11 89	0.26	0.05						0.008			0.12						
14 12 89	0.16	0.07					0.007	0.007		0.13	0.13						
24 1 90	0.04	0.04		0.001				0.004			0.11		L.0010		0.002		L.0010
22 2 90	0.04	0.02		0.003				0.008			0.09		L.0010		0.003		L.0010
21 3 90	0.29	0.05						0.017			0.28						
24 4 90	1.54	0.04						0.007			0.11						
23 5 90	1.52	0.04		0.012				0.004			0.07		0.004		0.011		0.011
19 6 90	1.1	0.07		0.022				0.004			0.14		0.01		0.024		0.03
26 7 90	0.38	L0.01						L0.004			0.03						
15 8 90	0.17	0.07		L0.001				L0.004			0.02		0.003		0.002		L0.001
18 9 90	0.08	L0.01						L0.004			L0.01						
10 10 90	0.07	0.03		L0.001				0.009			L0.01		L0.001		0.004		0.002
20 12 90	0.07	L0.01						L0.004			0.03						
29 1 91	0.04	L0.01		0.005				0.02			0.05		L0.001		L0.001		L0.001
19 2 91	0.04	L0.01						0.006			0.03						
20 3 91	0.04	0.04						0.02			0.04						
1 5 91	2.4	0.02						0.009			0.16						
29 5 91	0.69	0.04		0.004				L0.004			0.03		L0.001		0.003		0.005
25 6 91	1	0.02						L0.004			0.02						
1 8 91	0.14	0.05						L0.004			0.03						
21 8 91	0.27	L0.01		0.002				0.006			0.04		L0.001		0.005		0.003
2 10 91	0.06	L0.01						0.005			L0.01						
29 10 91	0.19	0.02		0.002				0.029			L0.01		L0.001		0.004		0.002
25 11 91	0.03	L0.01						0.01			0.03						
17 12 91	0.07	L0.01						0.012			0.03						

D M Y	Zn TOTAL 300**L	Zn EXT 303**L	As TOTAL 330**L	As DISS 331**L	Se TOTAL 340**L	Se DISS 341**L	Mo TOTAL 420**L	Ag EXT 473**L	Cd TOTAL 480**L	Cd EXT 483**L	Ba TOTAL 560**L	Ba EXT 563**L	Hg TOTAL 800**L	Hg TOTAL UG/L 800**L	Hg DISS 801**L	Pb EXT 823**L
19 2 87			0.0003		L.0002								L.0001			
18 3 87		0.025	0.0006	0.0005	L.0002	L.0002		L.0010		L.0010	0.11		0.0002			0.008
22 4 87				0.0007		L.0002							0.0002			
27 5 87				0.0006		L.0002							L.0001			
23 6 87		0.015		0.0004		L.0002		L.0010		L.0010	0.08			L0.05		0.004
20 7 87				0.0003		L.0002							0.0002			
17 8 87		0.006		0.0004		0.0002		L.0010		L.0010	0.12			L0.05		L.002
28 9 87				0.0008		L.0002								L0.05		
21 10 87		L.0010		0.0005		L.0002		L.0010		L.0010	0.11			L0.05		L.002
26 11 87				0.0004		L.0002								L0.05		
17 12 87				0.0004		0.0002								L0.05		
12 1 88		0.004	L.0002		L.0002			L.0010		L.0010	0.15			L0.05		0.002
9 2 88				0.0002		0.0003								L.0500		
24 3 88				0.0004		L.0002								L.0500		
20 4 88				0.0004		0.0002								L.0500		
12 5 88		0.031		0.0003		0.0004		L.0010		L.0010		0.04		L.0500		0.004
21 6 88				0.0006		0.0003								L.0500		
21 7 88				0.0005		L.0002								L.0500		
22 8 88		0.003		0.0002		L.0002		L.0010		L.0010		0.07		L.0500		L.002
27 9 88		0.008		0.0002		L.0002		L.0010		L.0010		0.08		L.0500		L.002
3 11 88		0.003		0.0002		0.0003		L.0010		L.0010		0.09		L.0500		0.002
30 11 88				0.0005		L.0002								L.0500		
15 12 88				L.0002		L.0002								L.0500		
25 1 89		0.009		0.0003		L.0002		L.0010		L.0010		0.12			L.0500	0.002
28 2 89				0.0005		0.0003								L.0500		
30 3 89				L.0002		L.0002								L.0500		
2 5 89				0.0003		0.0002								L.0500		
25 5 89	0.138			0.0014		L.0001	0.02		0.004		0.53		L.0001			
22 6 89				L.0001		L.0001							L.0001			
26 7 89				0.0002		L.0001							L.0001			
28 8 89		0.022		0.0007		L.0002		L.0010		L.0010		0.18		L.0500		0.008
5 10 89				0.0003		0.0002								L.0500		
31 10 89		0.001		0.0002		0.0002		L.0010		L.0010		0.09		L.0500		0.002
29 11 89				0.0003		L.0002								L.0500		
14 12 89			0.0002	0.0002	L.0002	L.0002								L.0500		
24 1 90		0.003		0.0004		L.0002		L.0010		L.0010		0.11		0.24		L.002
22 2 90		0.004		0.0003		0.0002		L.0010		L.0010		0.13		L.0500		0.004
21 3 90				0.0006		0.0002								L.0500		
24 4 90				0.0008		0.0005								L.0500		
23 5 90		0.026		0.0006		0.0003		L.0010		L.0010		0.19		L.0500		0.005
19 6 90		0.057		0.0005		0.0004		L.0010		L.0010		0.36		L.0500		
26 7 90				0.004		L.0002								L0.05		
15 8 90		0.01		0.0004		0.0003		L0.001		L0.001		0.07		L0.05		
18 9 90				0.0003		L.0002								L0.05		
10 10 90		L0.001		0.0012		L.0002		L0.001		L0.001		0.08		L0.05		
20 12 90				0.0003		L.0002								L0.05		
29 1 91		0.003		0.0003		L.0002		L0.001		L0.001		0.13		L0.05		0.011
19 2 91				0.0003										L0.05		
20 3 91				0.0003		0.0003								L0.05		
1 5 91				0.0006		L.0002								L0.05		
29 5 91		0.009		L.0002		0.0005		L0.001		L0.001		0.1		L0.05		L.002
25 6 91				L.0002		0.0003								L0.05		
1 8 91				0.0006		L.0002								0.1		
21 8 91		0.009		0.0003		L.0002		L0.001		L0.001		0.1		L0.05		L.002
2 10 91				L.0002		L.0002								L0.05		
29 10 91		0.006		0.0003		L.0002		L0.001		L0.001		0.1		L0.05		L.002
25 11 91				0.0003		0.0003								L0.05		
17 12 91				0.0004		L.0002								L0.05		

D M Y	N PARTIC 079**L	N TKN 070**L	N PARTIC KJELD 079**L	N DISS KJELD 070**L	N TOTAL NH3 075**L	N TOTAL NH3 075**L	N DISS NO2 NO3 071**L	N DISS NO2 NO3 071**L	N DISS NO3 073**L	N DISS NO2 072**L	P TOTAL 150**L	P TOTAL 154**L	P DISS 151**L	P DISS 151**L	PO4 DISS ORTHO 152**L
19 2 87	0.05	0.36		0.36		0.07		0.119		0.004		0.034	0.026	0.029	
18 3 87	0.04	0.3		0.26	0.06		0.083			0.004	0.02	0.023	0.01	0.011	
22 4 87	0.39	0.68		0.32	0.04		0.029			L.0030	0.132		0.032	0.016	0.01
27 5 87							L.0030			L.0030	0.088	0.078	0.007	0.005	0.005
23 6 87	0.09	0.36		0.27	L.0100				0.011	L.0030	0.16		0.008	0.005	
20 7 87	0.1	0.26		0.18	L.0100		L.0030				0.07	0.048	0.005	0.003	
17 8 87	0.26	0.7		0.44	0.02		0.064				0.155	0.126	0.01	0.009	
28 9 87	0.02	0.22		0.2	0.01		0.004				0.018	0.018	0.004	0.003	
21 10 87		0.2		0.18	0.01		0.009				0.014		0.005		
26 11 87		0.44		0.2	0.04		0.018				0.017	0.023	0.008	0.007	
17 12 87		0.28		0.26	0.04		0.041				0.012		0.006		
12 1 88		0.4		0.38	0.05		0.057				0.012	0.0154	0.007	0.0099	
9 2 88		0.24		0.2	0.06		0.079				0.013	0.0173	0.008	0.0099	
24 3 88		0.84		0.32	0.04		0.093				0.045	0.043	0.014	0.016	
20 4 88	0.46	0.7		0.24	0.03		0.027				0.21	0.4927	0.006	0.0075	
12 5 88	0.5	0.8		0.3	0.02		0.003				0.23		0.008	0.0068	
21 6 88	0.24	0.56		0.32	0.02		0.017				0.196		0.006	0.009	
21 7 88	0.48	0.64		0.16	0.02		L.0030				0.075	0.0656	0.01	0.01	
22 8 88	0.02	0.18		0.16	0.01		L.0030				0.026	0.0164	0.007	0.0028	
27 9 88	0.06	0.16		0.1	L.0100		L.0030				0.006	0.0094	0.003	0.003	
3 11 88	0.08	0.22		0.14	L.0100		L.0030				0.017	0.0161	0.005	0.0048	
30 11 88	0.02	0.36		0.34	0.04		0.031				0.017	0.0208	0.007	0.0106	
15 12 88	0.04	0.28		0.24	0.05		0.082				0.022	0.0257	0.014	0.0182	
25 1 89	0.02	0.28		0.26	0.15		0.127				0.05	0.0558	0.04		
28 2 89	0.1	0.38		0.28	0.11		0.124				0.048	0.0491	0.036		
30 3 89	0.08	0.38		0.3	0.08		0.137				0.03	0.0326	0.02	0.0225	
2 5 89	0.04	0.92		0.88	0.06		0.13				0.3		0.012	0.0128	
25 5 89		2.09	1.57	0.52		0.07		0.044		0.007		0.43	0.02		
22 6 89		0.26	0.11	0.14		0.076		0.02		0.002		0.101	0.006	0.0091	
26 7 89		0.41	0.2	0.21		0.018		0.005		0.002		0.134	0.007	0.0084	
28 8 89	0.38	0.74		0.36	0.05		0.017				0.35		0.014		
5 10 89	0.14	0.56		0.42	0.02		0.009				0.064		0.01		
31 10 89	0.02	0.24		0.22	0.03		0.005				0.014	0.0144	0.004	0.006	
29 11 89	0.08	0.44		0.36	0.04		0.045				0.038	0.0358	0.005		
14 12 89	0.06	0.44		0.38	0.05		0.06				0.042	0.0366	0.012		
24 1 90	0.02	0.3		0.28	0.06		0.121				0.035	0.031	0.023	0.0245	
22 2 90	0.1	0.34		0.24	0.05		0.14				0.023	0.0269	0.013	0.0213	
21 3 90	0.47	1.31		0.84	0.09		0.194				0.17		0.09		
21 3 90												0.181		0.0996	
24 4 90	0.46	0.84		0.38	0.05		0.062				0.35	0.4344	0.018	0.0148	
23 5 90	0.52	0.8		0.28	0.05		0.03				0.27	0.2482	0.013	0.0195	
19 6 90	1.56	1.8		0.24	0.12		0.042				0.98		0.013		
26 7 90	0.12	0.28		0.16	L0.01		L0.003				0.09	0.0862	0.006	0.0063	
15 8 90	0.12	0.12		L0.02	L0.01		L0.003				0.035	0.0367	0.004		
18 9 90	0.08	0.24		0.16	L0.01		L0.003				0.014	0.0146	L0.003	0.0027	
10 10 90	0.04	0.2		0.16	L0.01		L0.003				0.012	0.0132	0.004	0.0028	
20 12 90		0.28		0.24	L0.01		0.09				0.016		L0.003		
29 1 91	0.02	0.22		0.2	0.06		0.099				0.02		0.012		
19 2 91	0.04	0.32		0.28	0.1		0.122				0.034		0.02		
20 3 91	0.02	0.36		0.34	0.06		0.153				0.051		0.03		
1 5 91	0.98	1.4		0.42	0.04		0.06				0.475		0.019		
29 5 91	0.3	0.54		0.24	0.03		0.021				0.399		0.035		
25 6 91	0.16	0.4		0.24	L0.01		0.027				0.17		0.023		
1 8 91	0.06	0.16		0.1	L0.01		L0.003				0.046		0.016		
21 8 91	0.08	0.64		0.56	L0.01		0.02				0.111		0.016		
2 10 91	0.04	0.12		0.08	L0.01		0.004				0.012		L0.003		
29 10 91	0.04	0.16		0.12	L0.01		0.012				0.032		0.004		
25 11 91	0.02	0.32		0.3	L0.01		0.109				0.021		L0.003		
17 12 91	0.04	0.28		0.24	0.05		0.08				0.025		0.013		

D	M	Y	CARBON TOTAL 060**L	CARBON TOTAL ORG 060**L	CARBON TOTAL INORG 060**L	CARBON PARTIC TOTAL 069**L	CARBON PARTIC ORG 069**L	CARBON DISS ORG 061**L	CARBON DISS INORG 061**L	BOD 5 DAY 082**L	COD TOTAL 083**L	PHENOL 065**L	COLI TOTAL NO/DL 360**L	COLI FECAL NO/DL 360**L	FECAL STREP NO/DL 361**L	CHLORO PHYLLa MG/M3 067**L
19	2	87				0.67		4.2	46.6			0.005	16	L4.0	8	0.1
18	3	87					0.4	6.8	42			0.004	16	L4.0	L4.0	0.2
22	4	87	35.5	11				10.2	24.5	2.3		0.002	170	L10.0	L10.0	1.7
27	5	87		7.8				7.6	25.5			0.001	250	20	10	1
23	6	87		2.4			0.1	2.3				0.001	430	24		0.7
20	7	87		2.8	24		L.2000	2.8				0.001	100	16	60	0.8
17	8	87		12.8			0.6	12.2				0.004				0.6
28	9	87	37.9	5.4			0.2	5.2				0.002	100	4	12	0.9
21	10	87	42.8	5.8				5.7	37			0.003	14	L1.0	2	0.7
26	11	87	46.8	4.8				4.6	42			0.001	L4.0	L4.0	L4.0	0.3
17	12	87	60.1	6.6				6.4	53.5			0.004	4	L4.	4	0.3
12	1	88	57	8				7.8	49			L.0010	L4.0	L4.0	L4.0	0.3
9	2	88	50.2	7.2				7	43			0.004	12	L4.0	L4.0	0.2
24	3	88	47.9	8.4				8.2	39.5			0.001	20	L4.0	24	2
20	4	88		6.2			0.2	6				0.002	20	8	12	6.2
12	5	88		6.2			0.7	5.5				0.002	12	8	4	4.9
21	6	88		6			0.4	5.6				0.001	100	32	54	0.6
21	7	88		9.1			0.6	8.5				0.003				1.4
22	8	88		3.2			0.6	2.6				L.0010	60	4	4	0.7
27	9	88		5.3			0.3	5				L.0010	290	8		0.7
12	10	88													136	
3	11	88		4.2			0.3	3.9				0.002	72	L4.	32	0.5
30	11	88		5.9			0.6	5.3				0.006	40	L4.	4	0.3
15	12	88		5			0.4	4.6				0.007	16	4	L4.	0.3
25	1	89		6.4			0.2	6.2				0.012	160	L4.0	176	0.1
28	2	89		7.3			0.2	7.1				0.014	20	L4.0	4	0.1
30	3	89		8.6			0.2	8.4				0.002				0.1
2	5	89		8.4			0.6	7.8				0.001	150	L4.	28	3.6
25	5	89						21.6				0.014	3000	40	200	1.5
22	6	89						5.1				0.004	16	4	60	0.6
26	7	89						8.7	25.5			0.006		24	16	1.6
28	8	89		13.2			0.5	12.7				0.001				1
5	10	89		9.7			0.5	9.2				0.002	140	36	310	1.6
31	10	89		6.4			0.2	6.2				L0.001	28	L4.	332	0.5
29	11	89		8.9			0.2	8.7				0.002	204	L4.	8	0.5
14	12	89		8.3			0.2	8.1				L.0010	24	L4.	L4.	0.6
24	1	90		7			0.4	6.6				L.0010	12	L4.	L4.	0.1
22	2	90		6.7			0.1	6.6				L.0010	20	L4.	88	L0.1
21	3	90		10.5			L.2000	10.5				0.011	6600	20	196	0.8
24	4	90		9.1			1.2	7.9				0.001	710	4	28	4.5
23	5	90		8.7			0.6	8.1				L.0010	78	4	L4.	2.1
19	6	90		12.8			2	10.8				0.001				1
26	7	90		4.3			0.3	4				L0.001		12	4	2.3
15	8	90		4			1.6	2.4				L0.001	30	L10.	L10.	3
18	9	90		2.3			L0.2	2.3				L0.001	45	12	4	1.2
10	10	90		3.1			L0.2	2.9				L0.001	30	L4.	220	0.6
20	12	90		7.4				5.7				0.002				
29	1	91		7.2			L0.2	7		0.7	24	0.003				
19	2	91		2.8			1	1.8				0.002				
20	3	91		6.2			0.5	5.7		1	15	L0.001				
1	5	91		18.5			3	15.5				0.003				
29	5	91		6.6			0.8	5.8				L0.001				
25	6	91		5.2			0.7	4.5				L0.001				
1	8	91		2.7			L0.2	2.5				L0.001				
21	8	91		6.4			1.2	5.2				L0.001				
2	10	91		3.9			0.6	3.3				L0.001				
29	10	91		5			0.3	4.7				L0.001				
25	11	91		5.2			L0.2	5.2				L0.001				
17	12	91		6.1			L0.2	6				L0.001				

Results as mg/L unless noted. ** - more than one analytical code may be included; k - kilometre; U - upstream of; D - downstream of; L - left; C - centre; R - right; LR - left/right comp.; F - field measurement; L - lab analysis

APPENDIX 3. AOX, CHLOROPHENOLIC, AND RESIN-FATTY ACID DATA, WAPITI-SMOKY RIVER SURVEYS, 1991

APPENDIX 3. WAPITI-SMOKY-PEACE RIVERS SURVEY. FEBRUARY - MARCH 1991, AOX, CHLOROPHENOLICS, AND RESIN ACID DATA.

SITE	STATION CODE (00AL07-)	Date	AOX (mg/L)	4-CP	2,4-DCP	2,4,6-TCP	2,3,4,6-TeCP	PCP	4-CG	4,5-DCG	4,6-DCG	3,4,5-TCG
WR @ HWY.40	GE2015	27-Feb	0.009	nd	nd	nd	nd	nd	nd	nd	nd	nd
WR d/s P+G Haul Br.	GE2300	27-Feb	0.008	nd	nd	nd	nd	nd	nd	nd	nd	nd
WR @ Rail Br. - LR Composite	GE3060	27-Feb	0.956	nd	0.25	0.45	nd	nd	0.65	0.77	0.08	0.38
WR 10 km d/s P&G Final Effl.	GE3500	28-Feb	1.010									
WR u/s Bear R.	GE4050	28-Feb	0.906	nd	0.24	0.44	nd	nd	0.06	0.75	0.05	0.36
WR 6 km u/s of mouth	GE5000	28-Feb	0.859									
WR 0.5 km u/s mouth	GJ1000	28-Feb	0.877	nd	0.22	0.42	nd	nd	0.05	0.61	0.09	0.37
SR u/s Puskwaskau	GJ2030	05-Mar	0.365	nd	0.06	0.13	nd	nd	0.03	0.38	nd	0.08
SR @ km 105	GJ2050	05-Mar	0.392	nd	0.04	0.09	nd	nd	0.04	0.40	nd	0.07
SR @ Watino	GJ2060	06-Mar	0.452	nd	0.03	0.09	nd	nd	nd	0.38	nd	0.09
SR near mouth	GJ5000	11-Mar	0.249	nd	0.03	0.09	nd	nd	nd	0.32	nd	0.06
PR u/s SR-L	FD4500	11-Mar	0.014	nd	nd	nd	nd	nd	nd	nd	nd	nd
PR u/s SR-C	FD4575	11-Mar	0.009	nd	nd	nd	nd	nd	nd	nd	nd	nd
PR u/s SR-R	FD4550	11-Mar	0.010	nd	nd	nd	nd	nd	nd	nd	nd	nd
PR d/s DAISH-L	HA2500	12-Mar		nd	nd	nd	nd	nd	nd	nd	nd	nd
PR d/s DAISH-LC	HA2510	12-Mar		nd	nd	nd	nd	nd	nd	0.02	nd	nd
PR d/s DAISH-C	HA2520	12-Mar	0.024	nd	nd	nd	nd	nd	nd	nd	nd	nd
PR u/s Whitemud R.-L	HA2800	12-Mar		nd	nd	nd	nd	nd	nd	nd	nd	nd
PR u/s Whitemud R.-C	HA2820	12-Mar	0.018	nd	nd	nd	nd	nd	nd	nd	nd	nd
PR u/s Whitemud R.-R	HA2840	12-Mar		nd	nd	nd	nd	nd	nd	nd	nd	nd
PR east of Manning-L	HC1000	13-Mar	0.013									
PR east of Manning-C	HC1020	13-Mar	0.021	nd	nd	nd	nd	nd	nd	0.02	nd	nd
PR east of Manning-R	HC1040	13-Mar	0.019									
PR @ Carcajou	HD1030	18-Mar	0.021	nd	nd	nd	nd	nd	nd	nd	nd	nd
PR near Ft. Vermilion	HF0010	18-Mar	0.025	nd	nd	nd	nd	nd	nd	0.01	nd	nd
PR u/s WBNP	KA2000	20-Mar	0.019									
PR @ Peace Pt	KC1000	20-Mar	0.026									
GRAND PRAIRIE STP EFFLUENT	21AL07GE1000	27-Feb	0.064	nd	nd	nd	nd	nd	nd	nd	nd	nd
P&G SS/CW	20AL07GE8003	27-Feb	0.008	nd	nd	nd	nd	nd	nd	nd	0.03	nd
P&G FINAL EFFL. - A	20AL07GE8001	26-Feb	22.8	0.14	6.30	11.82	0.60	nd	0.56	7.54	2.42	9.53
- B	20AL07GE8001	26-Feb	25.1	0.18	6.13	11.83	0.49	nd	0.58	7.97	2.49	9.54
PEACE R. SEWAGE EFFLUENT	21AL07HA1000	11-Mar	0.122	1.01	2.16	1.38	0.09	0.40	0.47	nd	0.38	nd
DAISH FINAL EFFL. - A	20AL07HA2001	11-Mar	6.03	nd	nd	0.14	nd	nd	0.17	2.32	0.02	0.37
- B	20AL07HA2001	11-Mar	6.06	nd	nd	0.23	nd	nd	0.17	2.26	nd	0.45
PEACE RIVER OILS #1 WELL	HA2400	12-Mar	1.77									
BEAR R. @ MOUTH	GE4500	28-Feb	0.020	nd	nd	nd	nd	nd	nd	nd	nd	nd
SMOKY R. U/S OF WAPITI R.	GE1015	01-Mar	0.001	nd	nd	nd	nd	nd	nd	nd	nd	nd
SIMONETTE R. NEAR MOUTH	GF3500	01-Mar	nd									
PUSKWASKAU R. MOUTH	GJ2032	05-Mar	0.041									
LITTLE SMOKY R. MOUTH	GH1500	05-Mar	0.009	nd	nd	nd	nd	nd	nd	nd	nd	nd
WABASCA R. MOUTH	JD1000	18-Mar	0.010	nd	nd	nd	nd	nd	nd	nd	nd	nd

Blanks indicate not analyzed

nd = not detected. As µg/L unless noted. All values corrected for surrogate recovery.
WR - Wapiti River; SR - Smoky River; PR - Peace River

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SITE	3,4,6-TCG	4,5,6-TCG	TeCG	4-CC	3,4-DCC	3,5-DCC	4,5-DCC	3,4,5-TCC	3,4,6-TCC	TeCC	4,5-DCV	3,4,5-TCV	TeCV	TCS
WR @ HWY.40	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
WR d/s P+G Haul Br.	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
WR @ Rail Br. - LR Composite	0.15	0.34	0.23	0.05	0.03	0.41	1.66	3.56	0.09	0.08	0.11	0.06	nd	nd
WR 10 km d/s P&G Final Effl.														
WR u/s Bear R.	0.13	0.22	0.22	0.05	0.03	0.39	1.51	3.56	0.09	0.08	0.12	nd	nd	nd
WR 6 km u/s of mouth														
WR 0.5 km u/s mouth	0.14	0.35	0.21	nd	nd	0.29	1.06	2.62	0.05	nd	0.11	0.08	nd	nd
SR u/s Puskwaskau	0.03	0.04	0.06	nd	nd	0.09	0.29	0.62	nd	nd	nd	nd	nd	nd
SR @ km 105	nd	0.07	0.06	0.03	nd	0.07	0.25	0.38	nd	nd	nd	nd	nd	nd
SR @ Watino	nd	0.06	0.05	nd	nd	0.05	0.23	0.31	nd	nd	nd	nd	nd	nd
SR near mouth	nd	0.02	nd	nd	nd	0.06	0.20	0.29	nd	nd	nd	nd	nd	nd
PR u/s SR-L	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
PR u/s SR-C	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
PR u/s SR-R	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
PR d/s DAISH-L	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
PR d/s DAISH-LC	nd	nd	nd	nd	nd	nd	nd	0.01	nd	nd	nd	nd	nd	nd
PR d/s DAISH-C	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
PR u/s Whitemud R.-L	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
PR u/s Whitemud R.-C	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
PR u/s Whitemud R.-R	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
PR east of Manning-L														
PR east of Manning-C	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
PR east of Manning-R														
PR @ Carcajou	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
PR near Ft. Vermilion	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
PR u/s WBNP														
PR @ Peace Pt														
GRAND PRAIRIE STP EFFLUENT	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
P&G SS/CW	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
P&G FINAL EFFL. - A	4.49	9.93	7.78	0.52	0.69	9.31	40.65	73.38	2.77	3.99	2.40	0.83	0.12	0.04
- B	4.25	9.88	6.51	0.57	0.68	9.10	41.55	71.58	2.10	2.22	1.74	0.71	nd	0.06
PEACE R. SEWAGE EFFLUENT	nd	nd	nd	0.24	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
DAISH FINAL EFFL. - A	nd	0.08	0.07	nd	nd	nd	0.51	0.18	nd	nd	nd	nd	nd	nd
- B	nd	0.12	nd	0.12	nd	nd	0.51	0.10	nd	nd	nd	nd	nd	nd
PEACE RIVER OILS #1 WELL														
BEAR R. @ MOUTH	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
SMOKY R. U/S OF WAPITI R.	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
SIMONETTE R. NEAR MOUTH														
PUSKWASKAU R. MOUTH														
LITTLE SMOKY R. MOUTH	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
WABASCA R. MOUTH	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd

Blanks indicate not analyzed

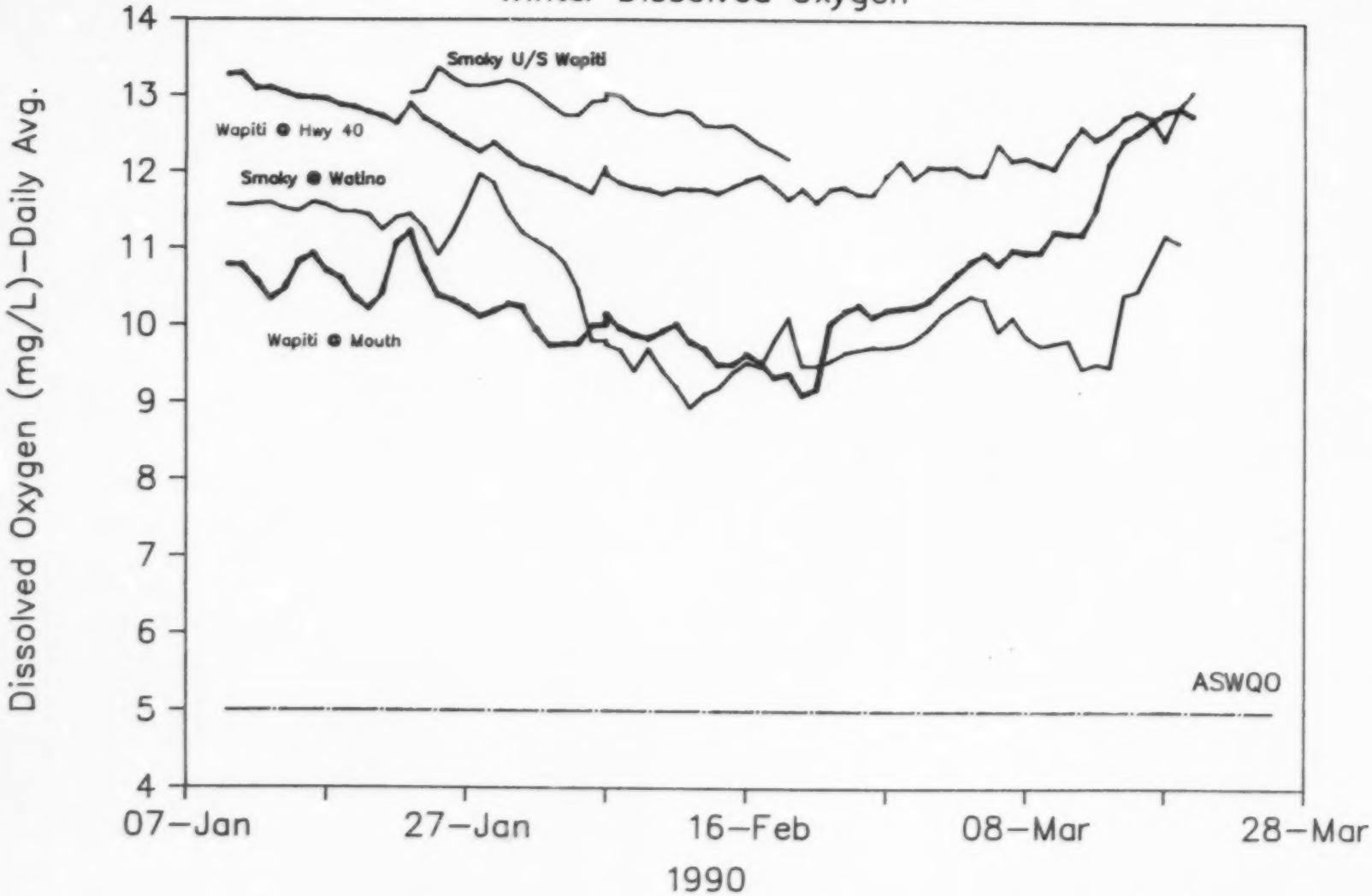
SITE	Pimaric	Sandar	Isopimaric	Palustric	Levopim	Dehydro	Abietic	Neoabietic	14-CDHA	12-CDHA	12,14-DCDH/
WR @ HWY.40	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
WR d/s P+G Haul Br.	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
WR @ Rail Br. - LR Composite	1.2	nd	1.3	0.4	nd	1.2	1.2	0.4	0.6	2.1	0.2
WR 10 km d/s P&G Final Eff.											
WR u/s Bear R.	1.0	nd	1.2	0.2	nd	1.2	1.0	nd	0.5	1.6	0.1
WR 6 km u/s of mouth											
WR 0.5 km u/s mouth	1.1	nd	1.3	0.4	nd	2.1	1.3	0.3	0.5	1.8	0.2
SR u/s Puskwaskau	0.4	nd	0.5	nd	nd	0.5	0.5	nd	0.2	0.6	nd
SR @ km 105	0.3	nd	0.4	nd	nd	0.3	0.3	nd	nd	0.4	nd
SR @ Watino	0.3	nd	0.4	nd	nd	0.3	0.3	nd	nd	0.4	0.1
SR near mouth	0.3	nd	0.4	nd	nd	0.3	0.3	nd	nd	0.3	nd
PR u/s SR-L	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
PR u/s SR-C	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
PR u/s SR-R	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
PR d/s DAISH-L	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
PR d/s DAISH-LC	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
PR d/s DAISH-C	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
PR u/s Whitemud R.-L	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
PR u/s Whitemud R.-C	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
PR u/s Whitemud R.-R	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
PR east of Manning-L											
PR east of Manning-C	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
PR east of Manning-R											
PR @ Carcajou	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
PR near Ft. Vermilion	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
PR u/s WBNP											
PR @ Peace Pt											
GRAND PRAIRIE STP EFFLUENT	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
P&G SS/CW	225.2	93.6	456.9	17.9	42.7	1709.0	362.4	38.2	nd	nd	nd
P&G FINAL EFFL. - A	31.9	nd	32.8	9.9	10.4	42.9	32.5	nd	18.3	66.4	5.9
- B	24.2	nd	25.9	14.6	nd	22.6	25.3	14.3	11.7	46.5	3.6
PEACE R. SEWAGE EFFLUENT	nd	nd	nd	nd	nd	5.4	nd	nd	nd	nd	nd
DAISH FINAL EFFL. - A	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
- B	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
PEACE RIVER OILS #1 WELL											
BEAR R. @ MOUTH	nd	nd	nd	nd	nd	0.2	nd	nd	nd	nd	nd
SMOKY R. U/S OF WAPITI R.	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
SIMONETTE R. NEAR MOUTH											
PUSKWASKAU R. MOUTH											
LITTLE SMOKY R. MOUTH	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
WABASCA R. MOUTH	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd

Blanks indicate not analyzed

APPENDIX 4. GRAPHS OF DISSOLVED OXYGEN FROM CONTINUOUS RECORDING METERS AT FOUR SITES IN THE WAPITI-SMOKY RIVER SYSTEM, 1990 AND 1991

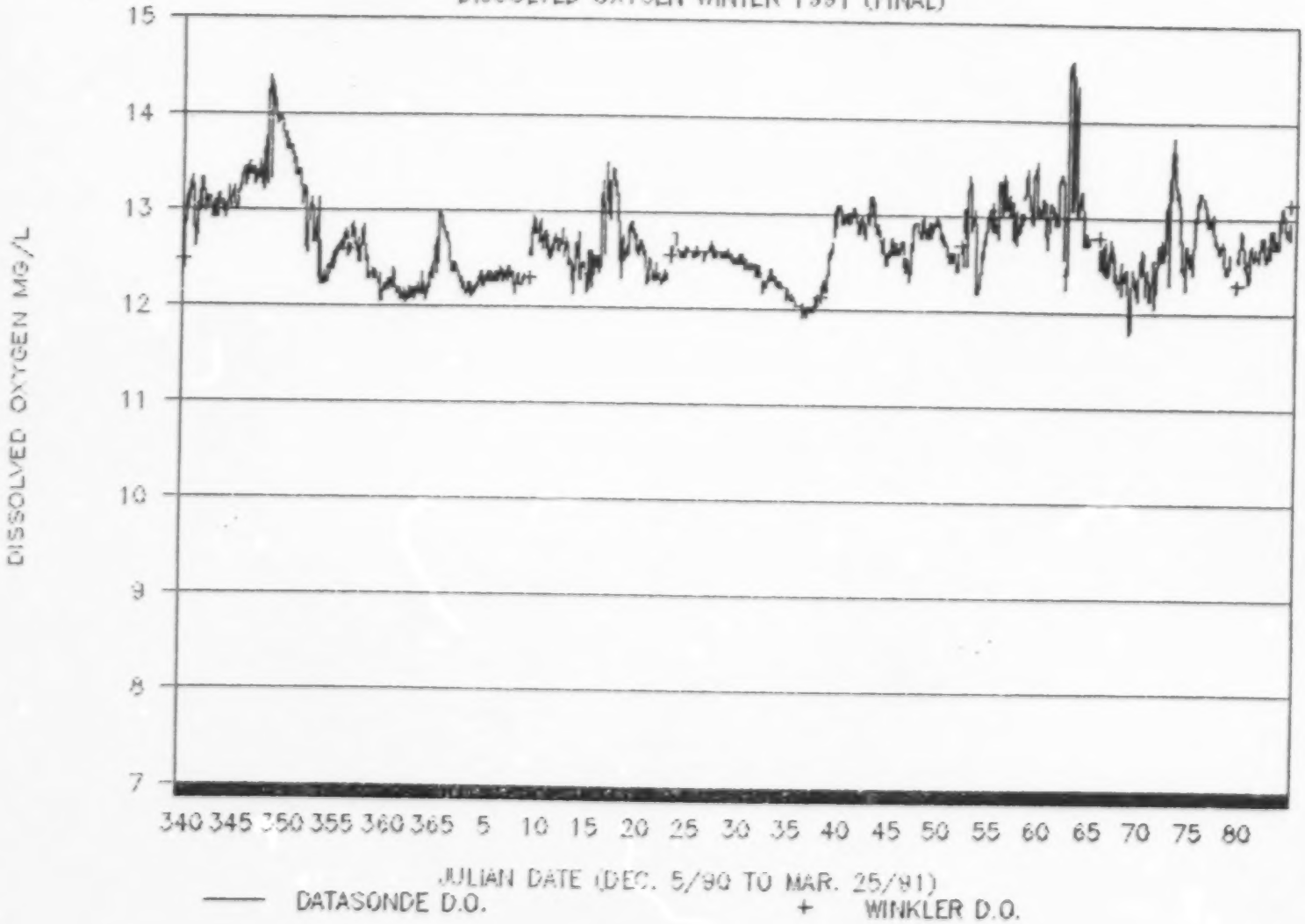
WAPITI–SMOKY RIVER

Winter Dissolved Oxygen



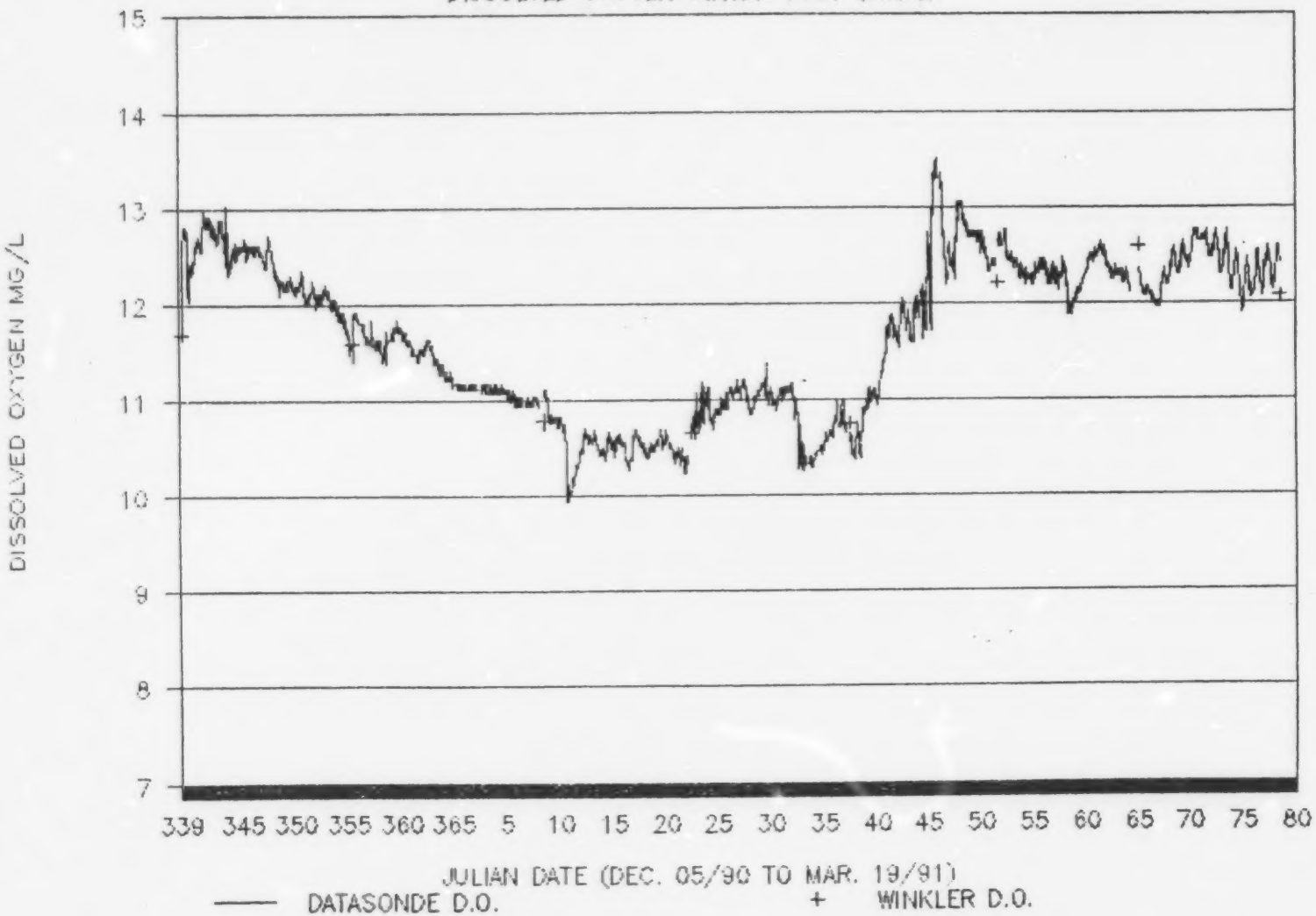
WAPITI RIVER NEAR ELMWORTH

DISSOLVED OXYGEN WINTER 1991 (FINAL)



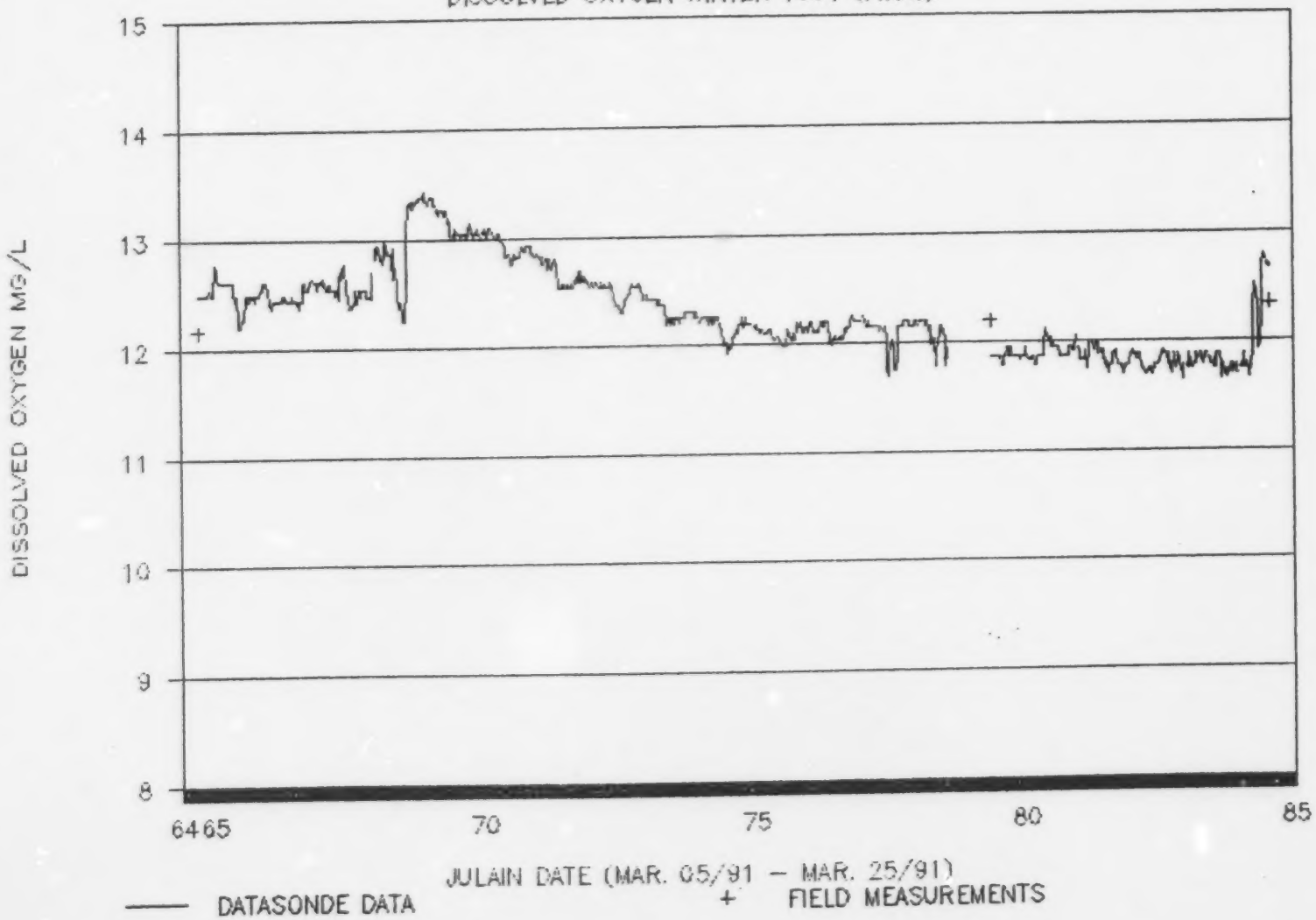
WAPITI RIVER AT MOUTH

DISSOLVED OXYGEN WINTER 1991 (FINAL)



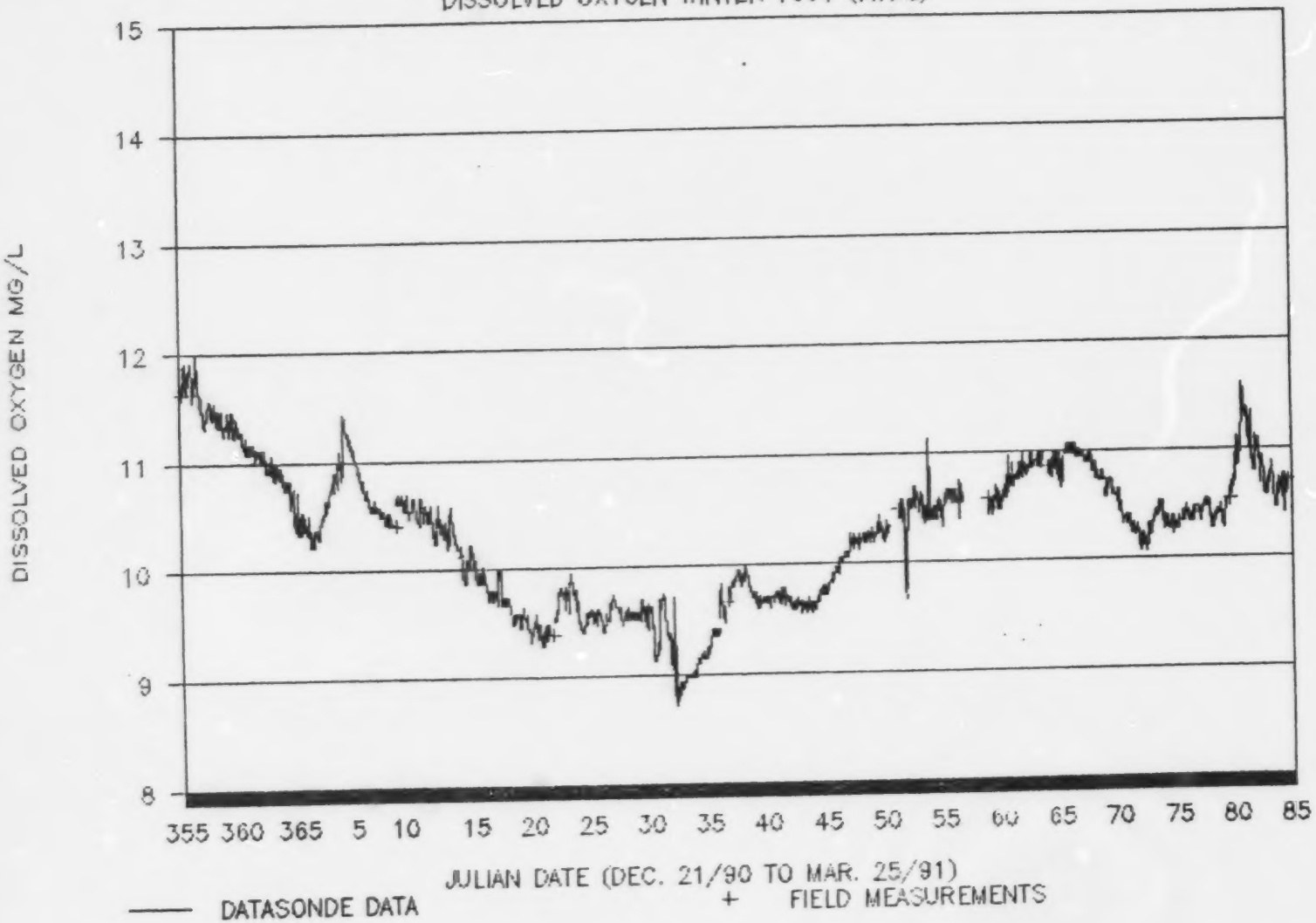
SMOKY RIVER ABOVE WAPITI RIVER MOUTH

DISSOLVED OXYGEN WINTER 1991 (FINAL)



SMOKY RIVER AT WATINO BRIDGE

DISSOLVED OXYGEN WINTER 1991 (FINAL)

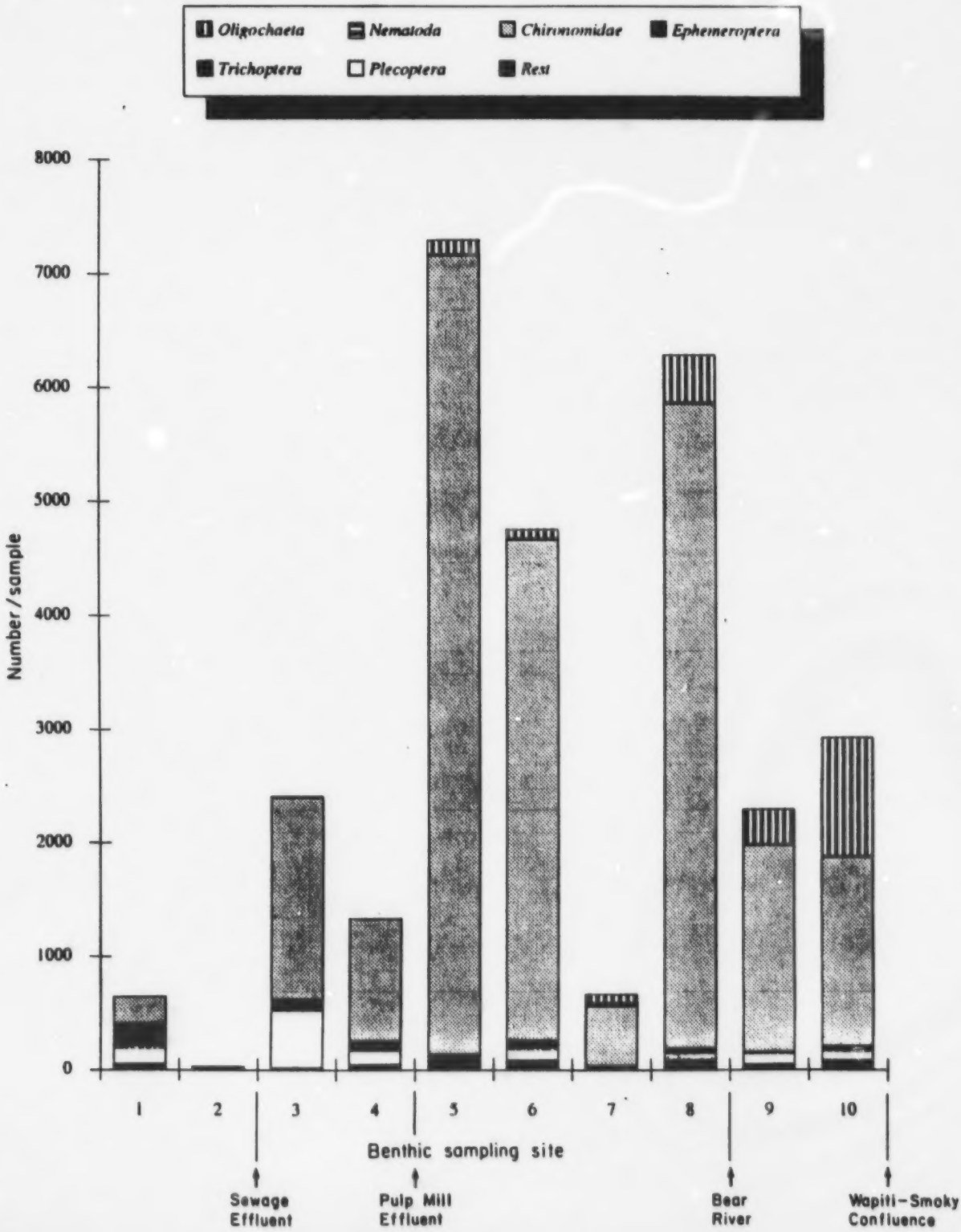


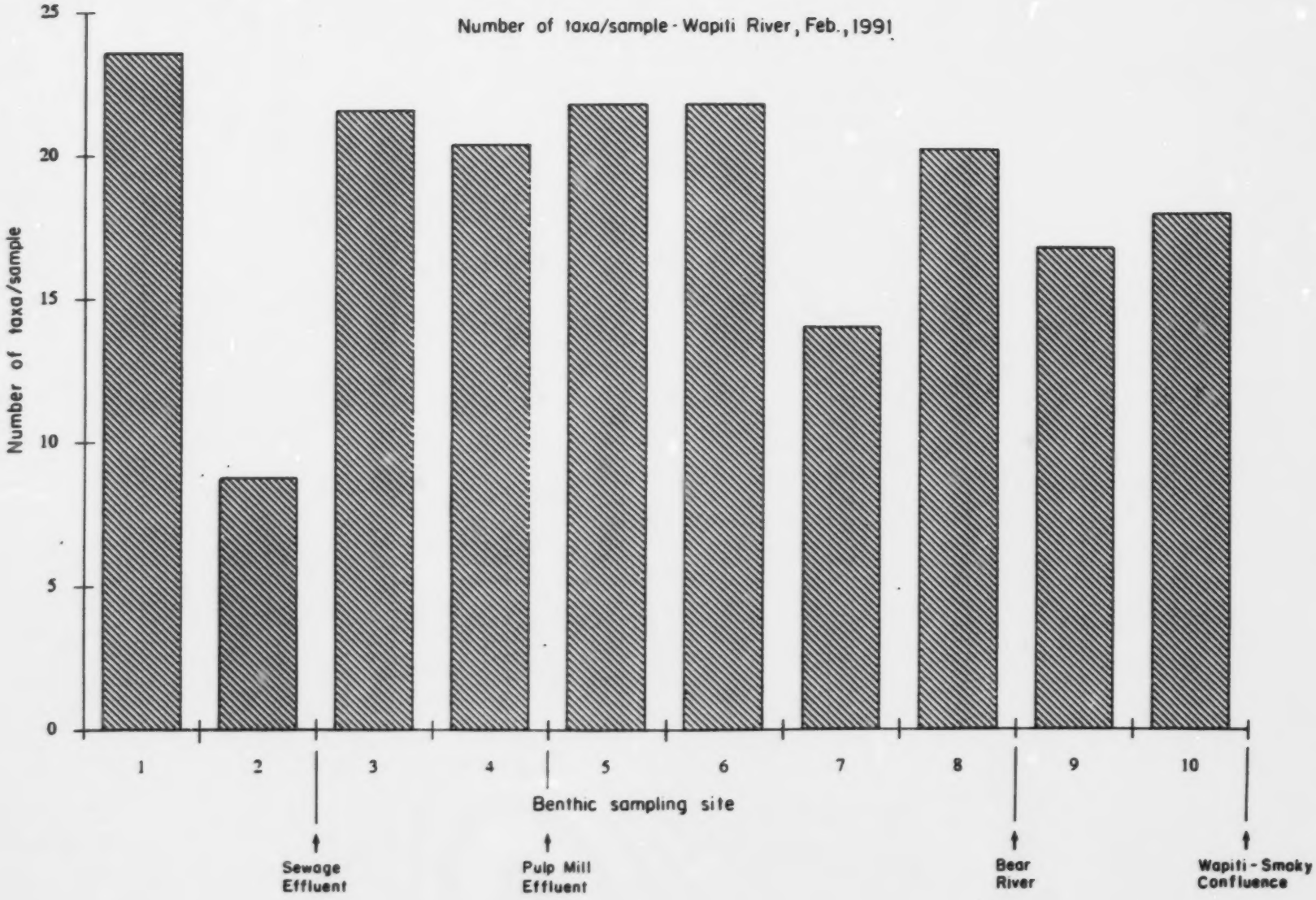
APPENDIX 5. ZOOBENTHIC DATA, WAPITI RIVER FEBRUARY, 1991

- Total numbers and major taxa, versus site.

- Number of taxa versus site.

Distribution of organisms among major taxa - Wapiti River, Feb., 1991




Number of taxa/sample - Wapiti River, Feb., 1991
Number of taxa/sample
25
20
15
10
5
0
1
2
3
4
5
6
7
8
9
10
Benthic sampling site
Sewage Effluent
Pulp Mill Effluent
Bear River
Wapiti - Smoky Confluence

CA2ALEN116
92W16
Supplement.

WATER QUALITY IN THE WAPITI-SMOKY RIVER SYSTEM UNDER LOW-FLOW CONDITIONS (1987-1991): A SYNOPSIS OF GOVERNMENT SURVEYS AND MONITORING

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SUPPLEMENT **26 June 1992**

Introduction

The above Synopsis assessed water quality in the Wapiti-Smoky rivers and compared the observed quality to objectives and guidelines. This Supplement provides graphs and short notes for water quality variables that were non-compliant with objectives or guidelines, in order to better support the conclusions in the Synopsis and to illustrate the degree and frequency of non-compliance.

Attached are one table and several graphs. The graphs plot the measured concentrations of the variables in the Wapiti-Smoky mainstem against river kilometre (from upstream to downstream). Up to four down-river surveys are so plotted, as per the symbols at the bottom of the graph. Where appropriate, the Alberta Surface Water Quality Objective (ASWQO) is shown. The location of key physical features is indicated by vertical dotted lines, including the Grande Prairie sewage treatment plant effluent (STP) and the Procter and Gamble bleached kraft pulp mill effluent (BKME). At locations where replicate samples were collected, the plotted value is the mean of the replicates. All the actual data are included in the Appendices of the Synopsis.

Findings

For many of the variables in the graphs, increases in concentration were observed downstream of, and attributable to, the pulp mill effluent. For some, increases were attributable as well to the sewage effluent. These causes were compiled in Table 1 of the Synopsis. Note that in most cases river concentrations were highest in the March 1989 survey, intermediate in Feb-Mar 1990, and lowest in the Feb-Mar 1991 survey. This results mainly from variations in dilution in the river. Wapiti River flows during the winter surveys were the inverse of the concentrations as below:

Wapiti River at Hwy 40, near Grande Prairie

1 March 1989	5.0 m^3/s
27 February 1990	13.0 m^3/s
27 February 1991	16.0 m^3/s
Mean February (1960-88)	13.2 m^3/s
7Q10	6.95 m^3/s

Notes on individual variables follow the graphs (see also the Synopsis).

FIELD EVALUATIONS OF ODOUR DURING DOWN-RIVER SURVEYS OF THE WAPITI-SMOKY RIVER SYSTEM, 1989-1991.

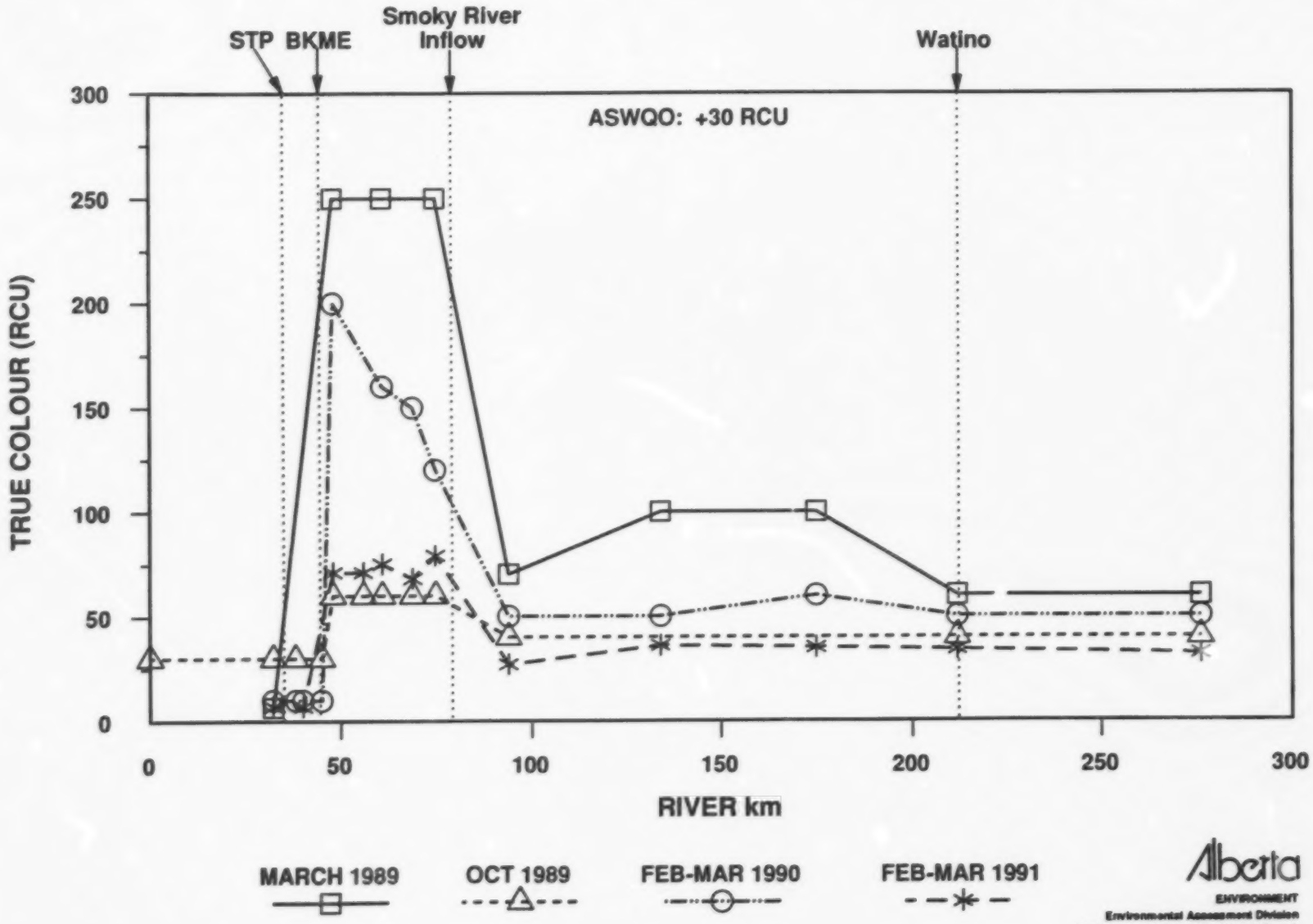
STATION	STATION CODE 00AL07-	1989		1990	1991
		1-9 MAR.	2-10 OCT.	27 FEB. - 7 MAR.	27 FEB. - 11 MAR.
Mainstem Sites					
Wapiti R. 5 km u/s Red Willow R.	GC1000		0		
Wapiti R. at Hwy 40	GE2015	0	0	0	0
Wapiti R. 1 km u/s Grande Prairie STP	GE2200		0		
Wapiti R. 5 km d/s Grande Prairie STP	GE2250		0	0	
Wapiti R. d/s P&G Haul Road	GE2300		0	0	
Wapiti R. 1 km u/s P&G Eff.	GE2350		0	0	
Wapiti R. at Railroad Bridge	GE3050	+++	+	++	+++
Wapiti R. ~10 km d/s P&G Eff.	GE3500		+	++	+++
Wapiti R. 1 km u/s Bear R.	GE4050	+++	+	++	+++
Wapiti R. ~6 km u/s Mouth	GE4900		+	+	++
Wapiti R. at Mouth	GJ1000	++	+	0	++
Smoky R. at Bezanson/Hwy 34	GJ2020	+	+	++	++
Smoky R. u/s Puskwaskau R.	GJ2030	+	+	++	++
Smoky R. km 105	GJ2050	+		++	++
Smoky R. at Watino	GJ2060	+	+	++	++
Smoky R. between Watino and Mouth	GJ4000	+		++	
Smoky R. near Mouth	GJ5000	+	+	++	++
Tributaries					
Big Mountain Creek near Mouth	GE2400		0	0	
Bear R. near Mouth	GE4500	nf	0		+
Smoky R. u/s Wapiti	GF1015	0	0	0	0
Simonette R. near Mouth	GF3500	0	0		0
Puskwaskau R. near Mouth	GJ2032	0	0	0	0
Bad Heart R. near Mouth	GJ2034	0	0	0	
Little Smoky R. near Mouth	GH1500	0	0	0	0

P&G - Procter & Gamble; STP - Sewage Treatment Plant; u/s - upstream; d/s - downstream; nf - no flow; blanks indicate not sampled

Odour intensity (relative to most surface waters): +++ = High (strong or quite distinct), ++ = Medium (definitely noticeable), + = Low (faint, but present), 0 = no discernable odour

WRODOUR.BM

COLOUR IN THE WAPITI-SMOKY RIVER SYSTEM



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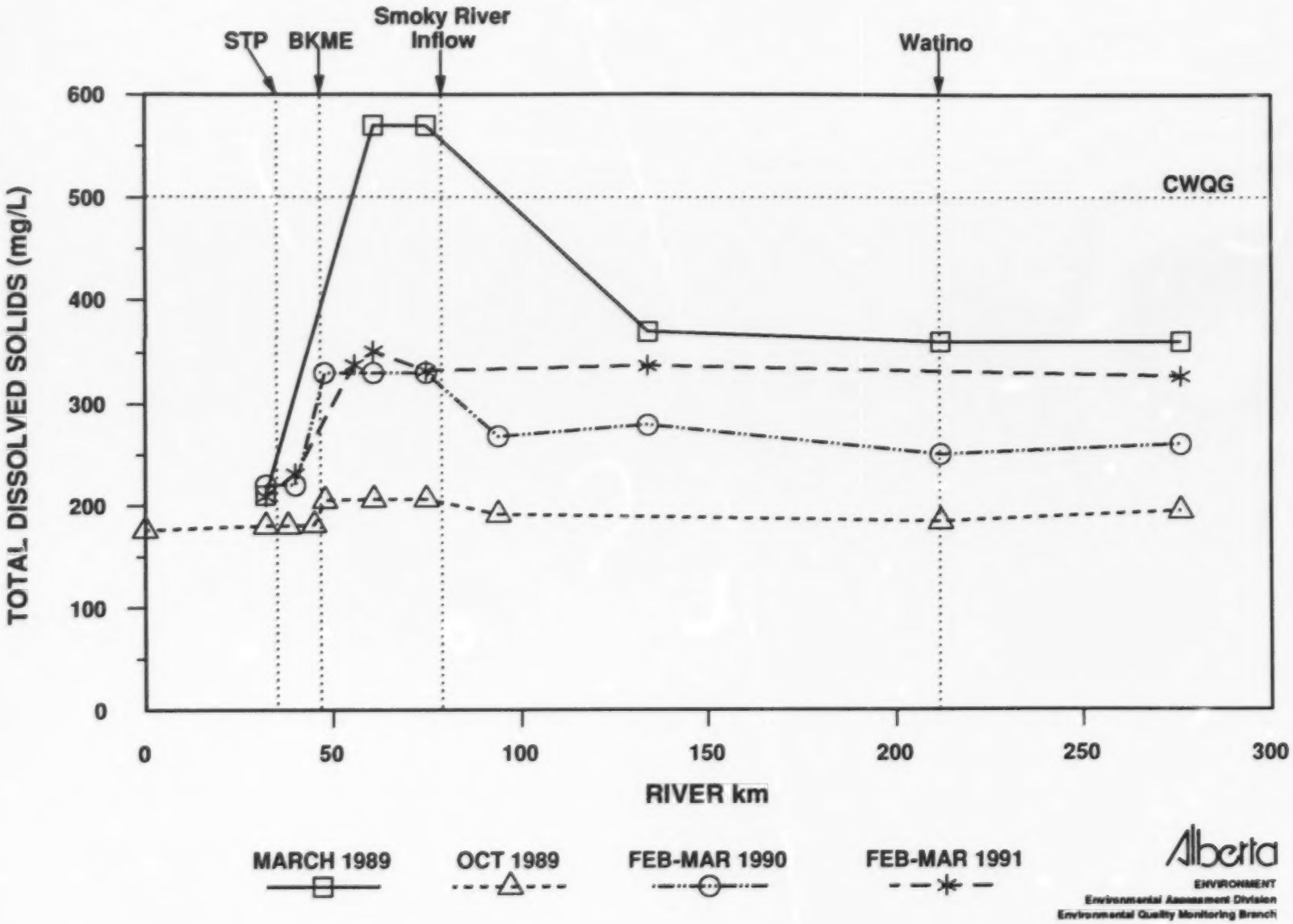
TOTAL DISSOLVED SOLIDS IN THE WAPITI-SMOKY RIVER SYSTEM



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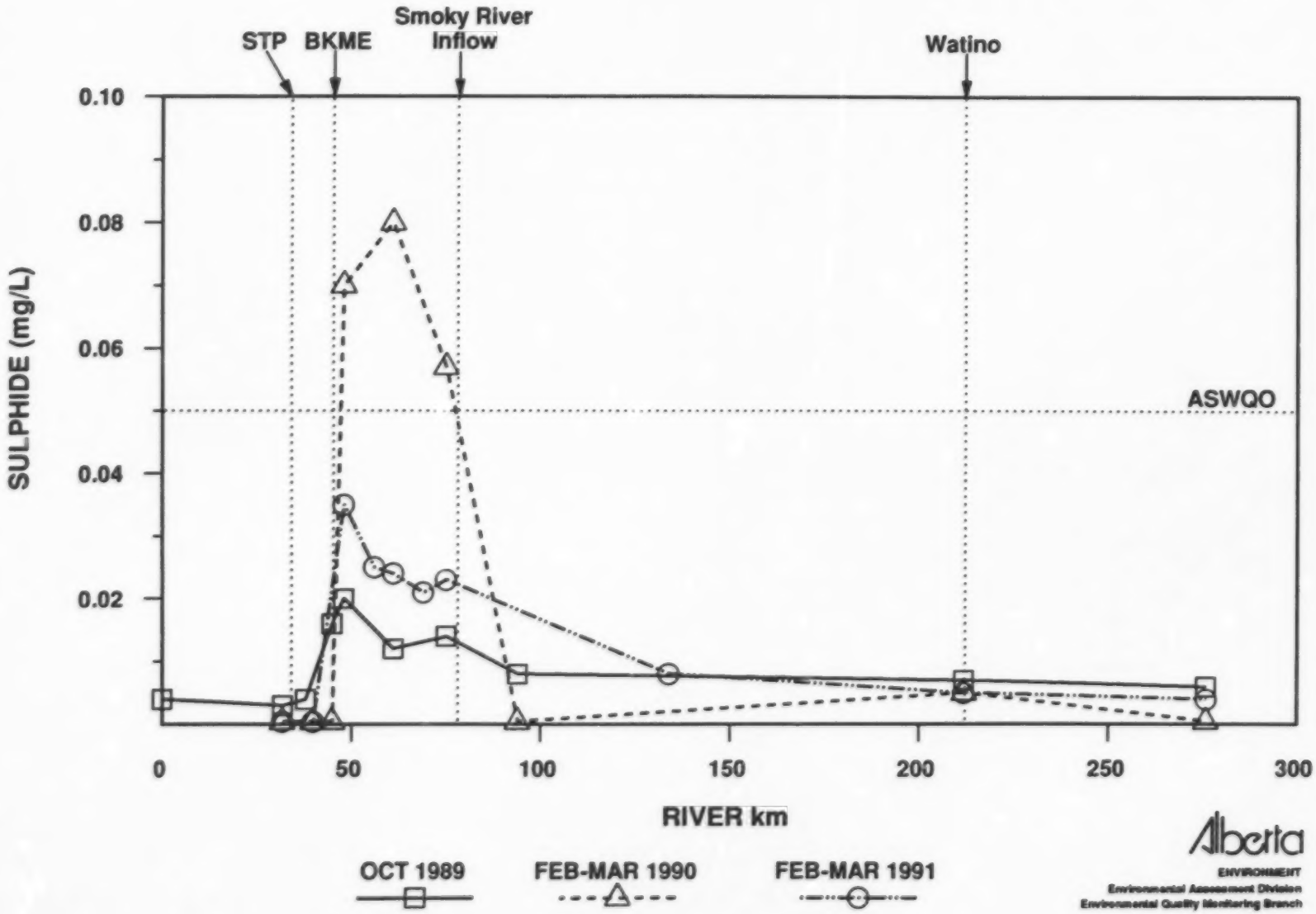
SULPHIDE IN THE WAPITI-SMOKY RIVER SYSTEM



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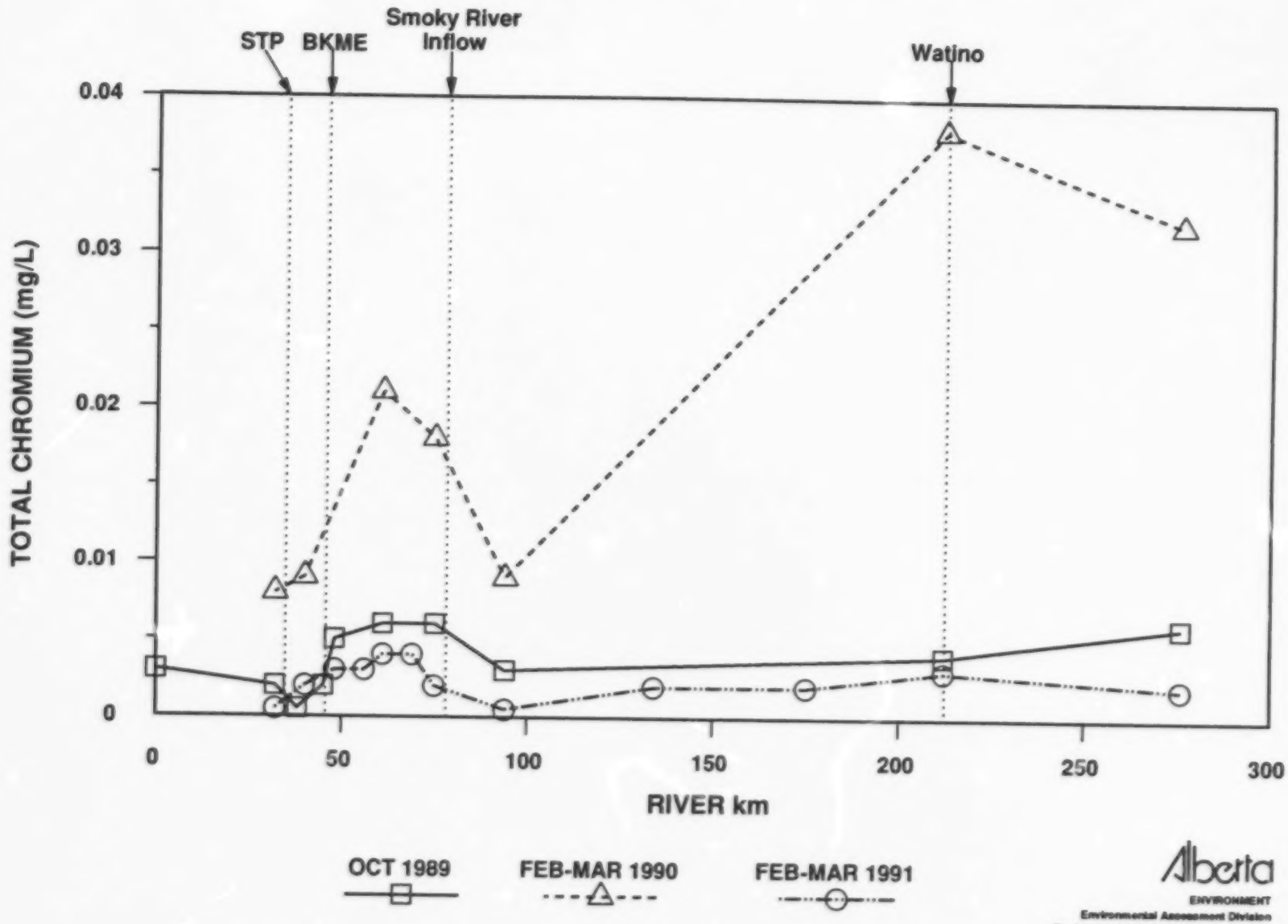
CHROMIUM IN THE WAPITI-SMOKY RIVER SYSTEM



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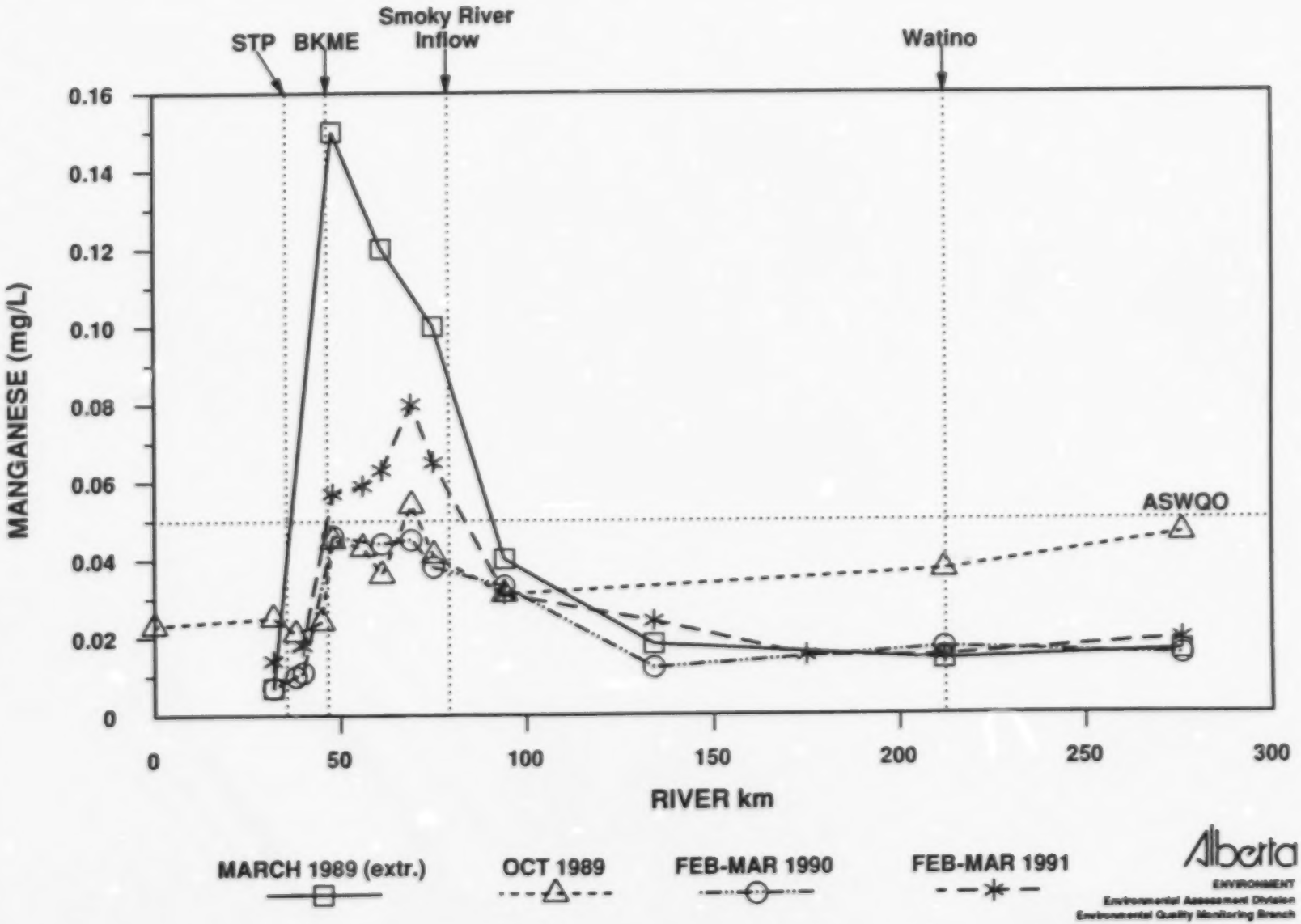
MANGANESE IN THE WAPITI-SMOKY RIVER SYSTEM



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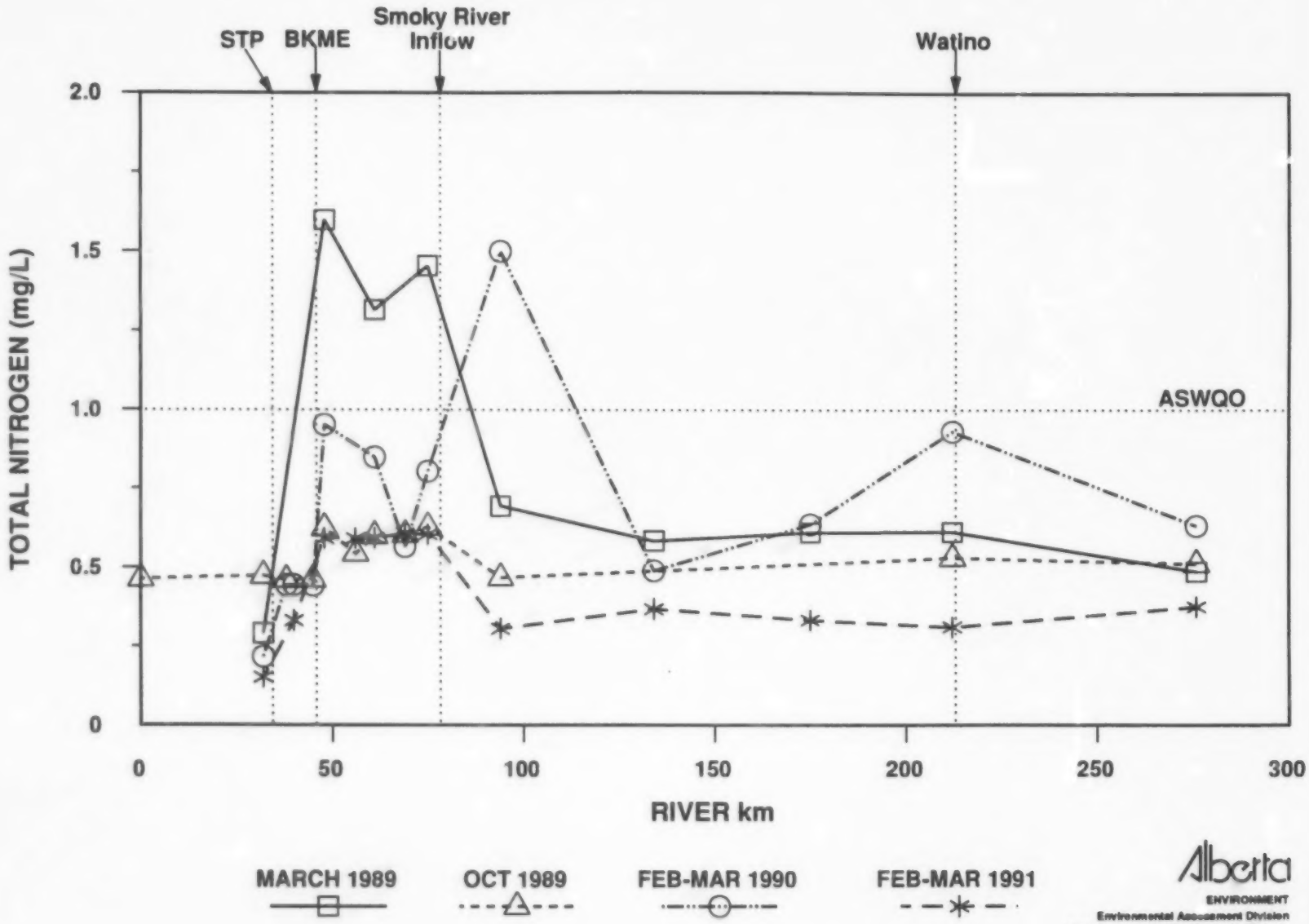
TOTAL NITROGEN IN THE WAPITI-SMOKY RIVER SYSTEM



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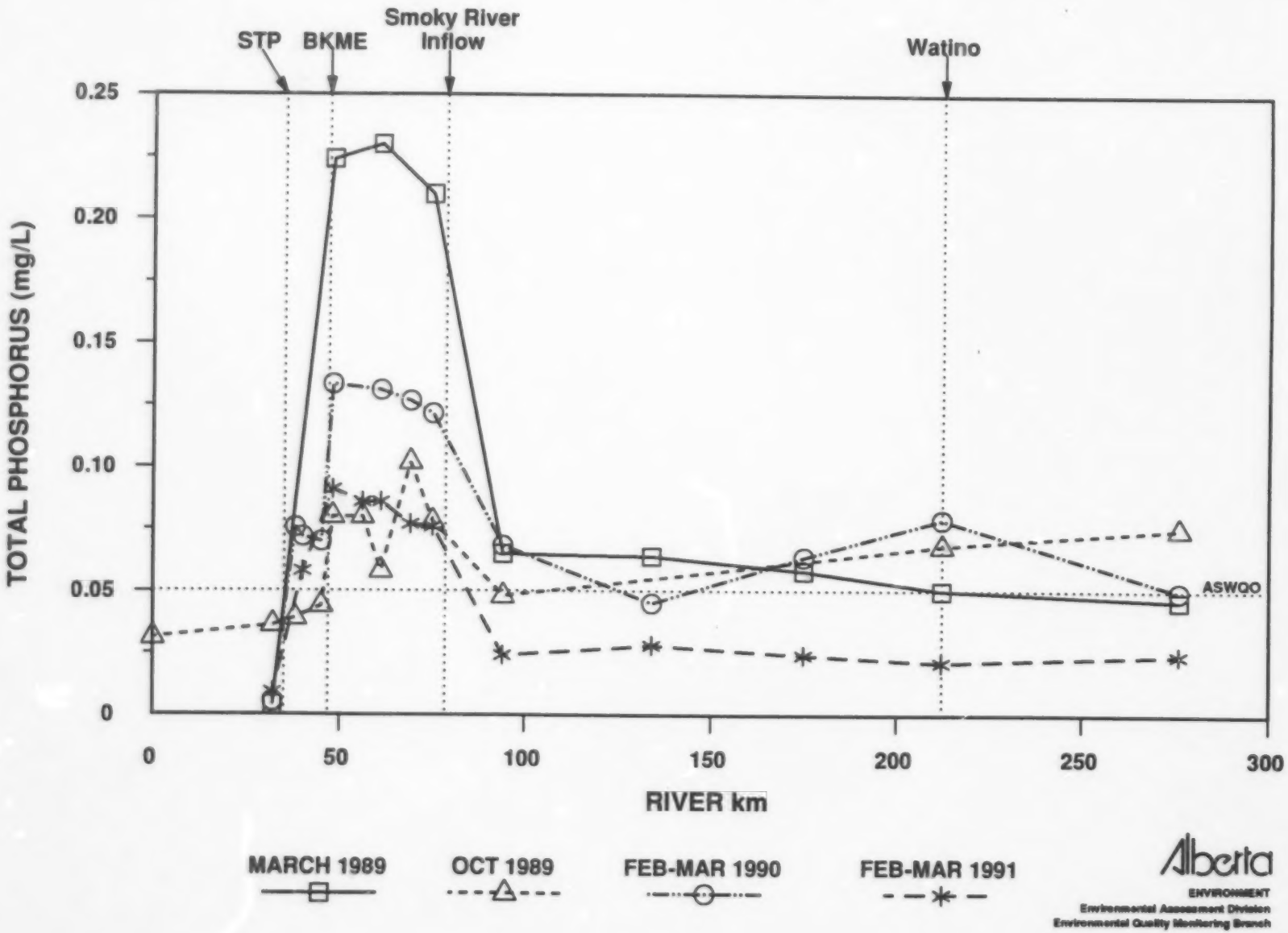
TOTAL PHOSPHORUS IN THE WAPITI-SMOKY RIVER SYSTEM



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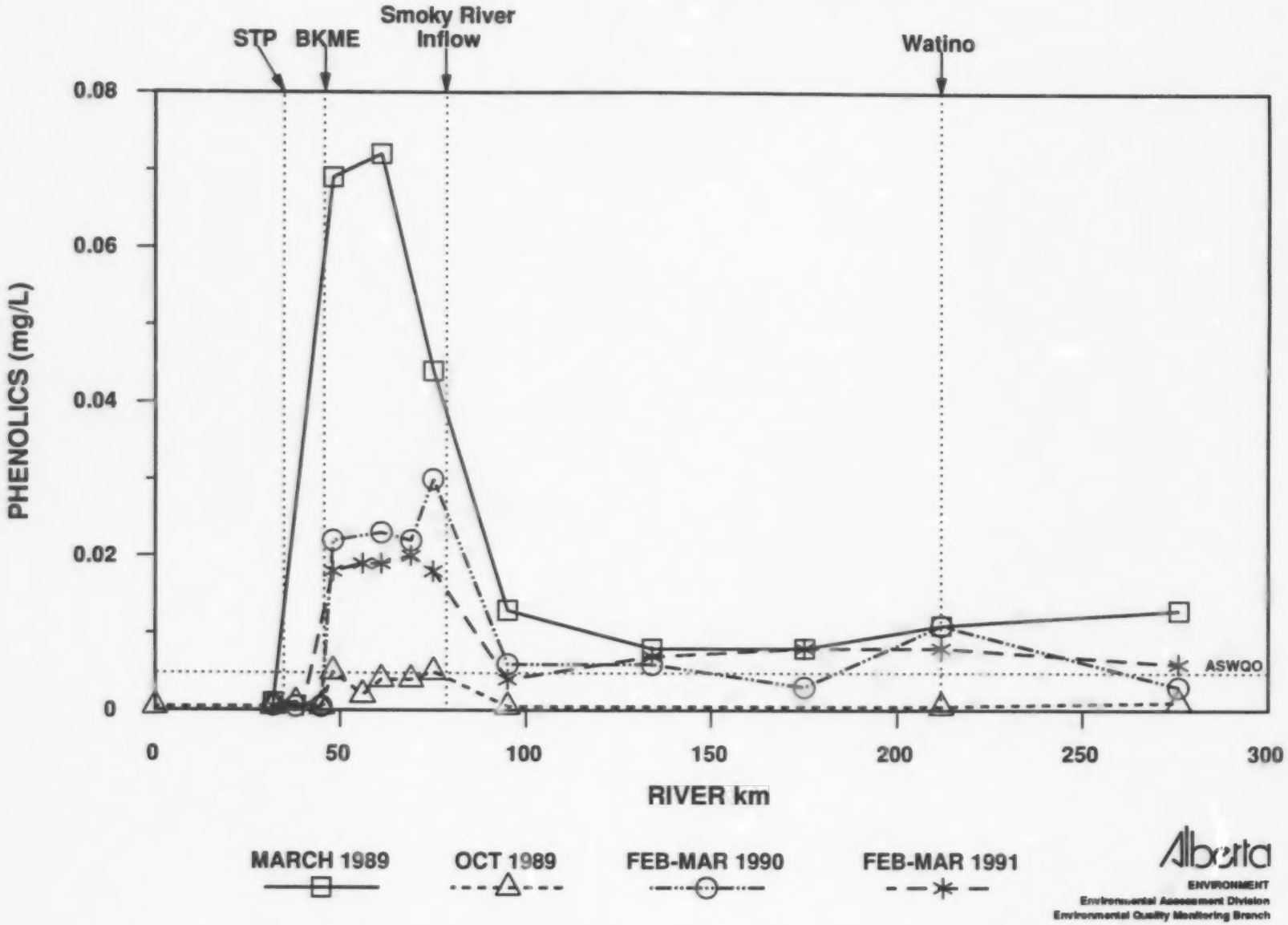
PHENOLICS IN THE WAPITI-SMOKY RIVER SYSTEM



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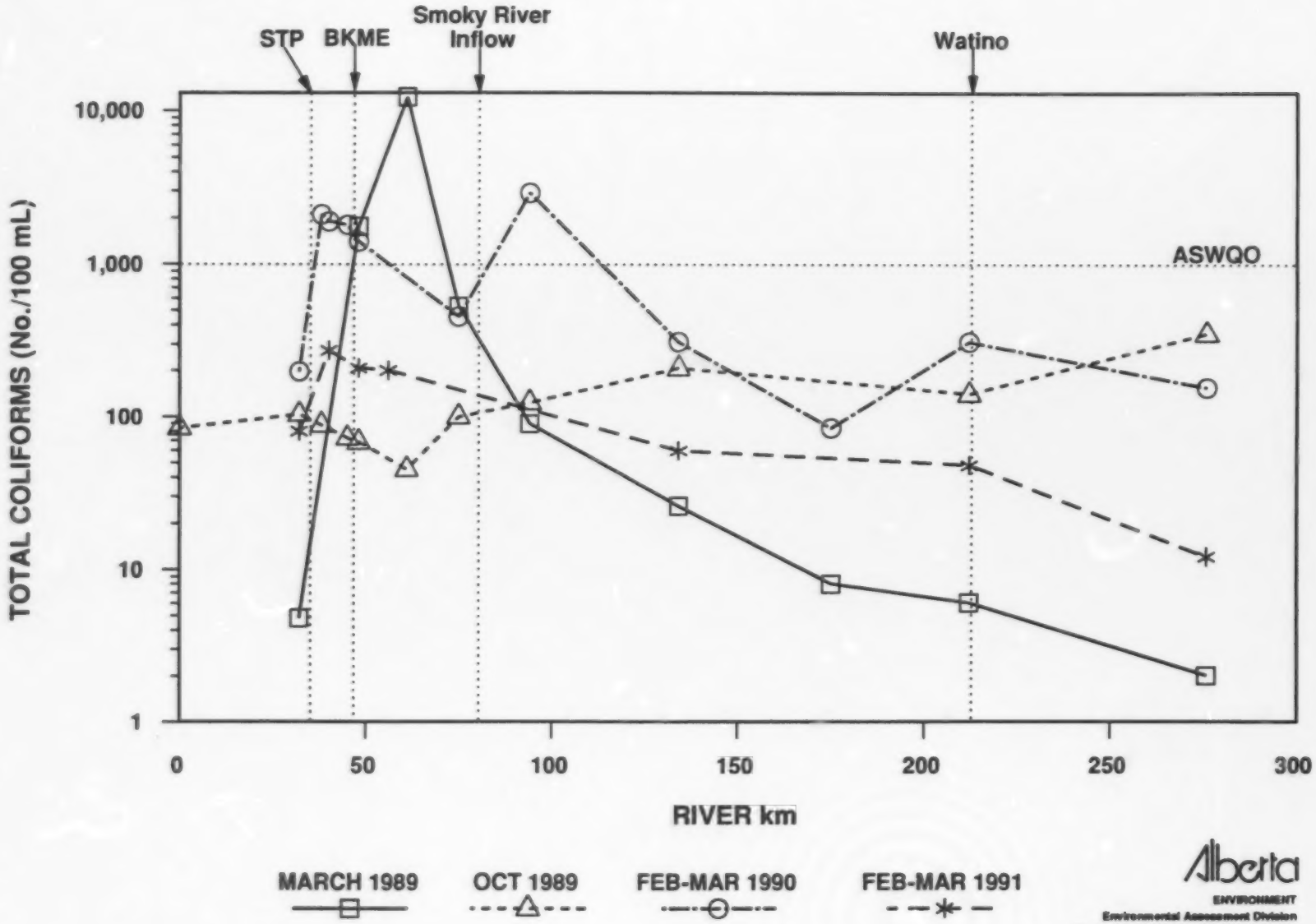
TOTAL COLIFORMS IN THE WAPITI-SMOKY RIVER SYSTEM



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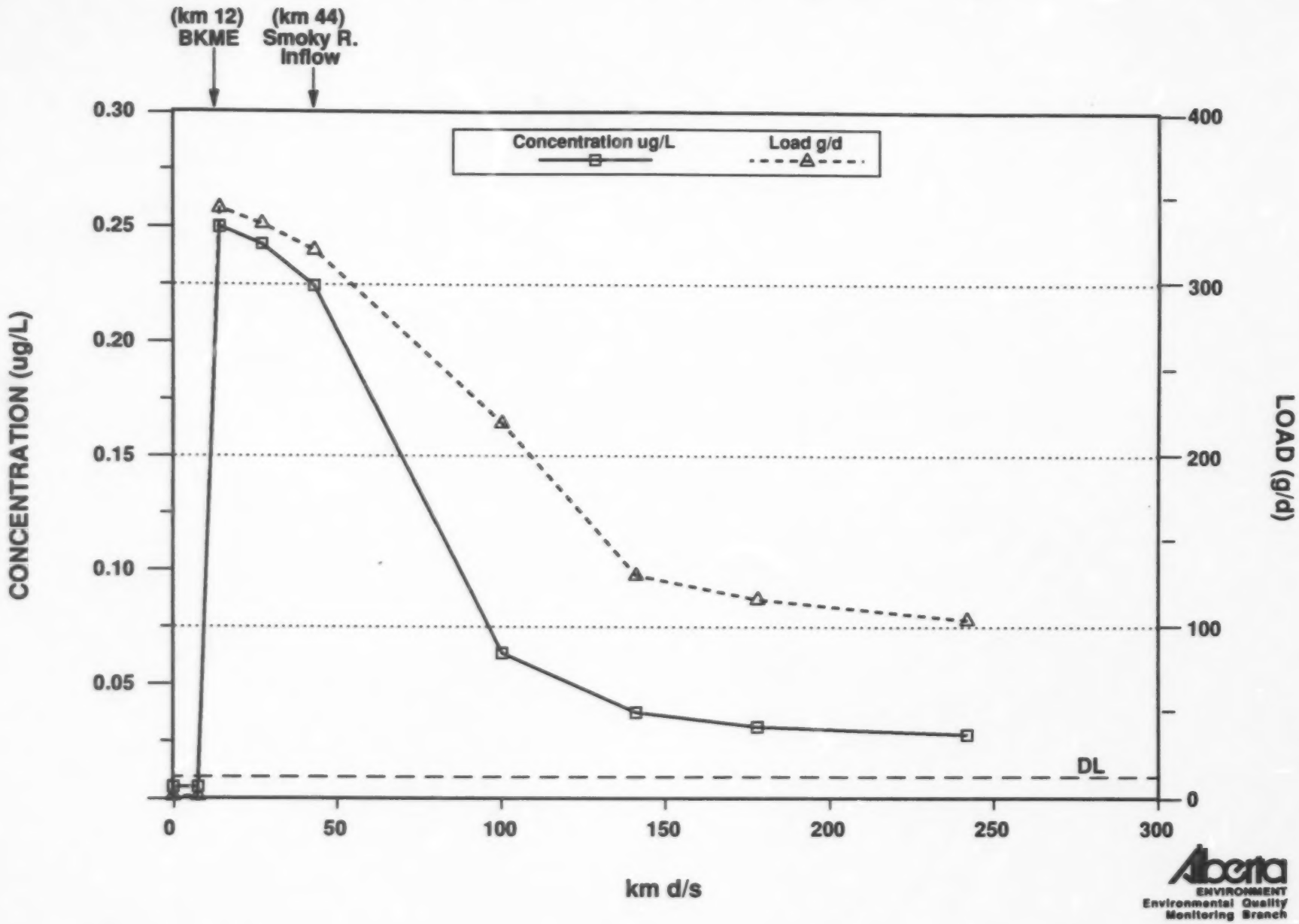
2,4-DCP IN WAPITI-SMOKY RIVER (FEB - MAR 1991)



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Odour

Field evaluations, done on water in-situ or on freshly collected water in glass jars, are compiled in the attached Table. Care was taken to ensure any odour in the air was not confused with odour in the water. The odour in the Wapiti-Smoky rivers was similar to that associated with bleached kraft pulp mills. The Canadian Water Quality Guideline is 'no objectionable odour'.

Colour

The ASWQO is a maximum increase of 30 colour units over background. Colour was out of compliance during the winter surveys due to the pulp mill effluent. In October 1989 tributaries contributed much more colour than in winter. The Wapiti remained in compliance in October 1989, in the vicinity of the pulp mill.

Total Dissolved Solids

This was measured as filterable residue, or as the difference between total and suspended solids. The observed values downstream of the pulp mill in March of 1989 do not comply with the Canadian guideline of 500 mg/L, set for aesthetics in drinking water and for irrigation of sensitive crops.

Sulphide

Sulphide was out of compliance downstream of the pulp mill in Feb-Mar 1990. This variable was not sampled during the lowest-flow survey of March 1989.

Manganese

Extractable manganese was analyzed in March 1989 and total manganese was analyzed in the other three surveys.

Chromium

The ASWQO is 0.05 mg/L and the CWQG is 0.02 mg/L for fish and 0.002 mg/L for other aquatic biota. The reason for the high concentrations in the lower Smoky River in Feb-Mar 1990 are not clear although chromium was also high in the Little Smoky River which enters the Smoky upstream of Watino.

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Total Coliform Bacteria

The ASWQO states that the geometric mean of at least five samples collected within a 30 day period should not exceed 1000/100 mL. The geometric mean of the five samples in the Wapiti River in a three day period during the Feb-Mar 1990 survey was 1352/100 mL. The cause was probably the sewage effluent.

2,4 Dichlorophenol

This compound was only surveyed on one occasion. Both concentration and mass flux (load) are plotted. The CWQG for dichlorophenols is 0.2 µg/L.

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